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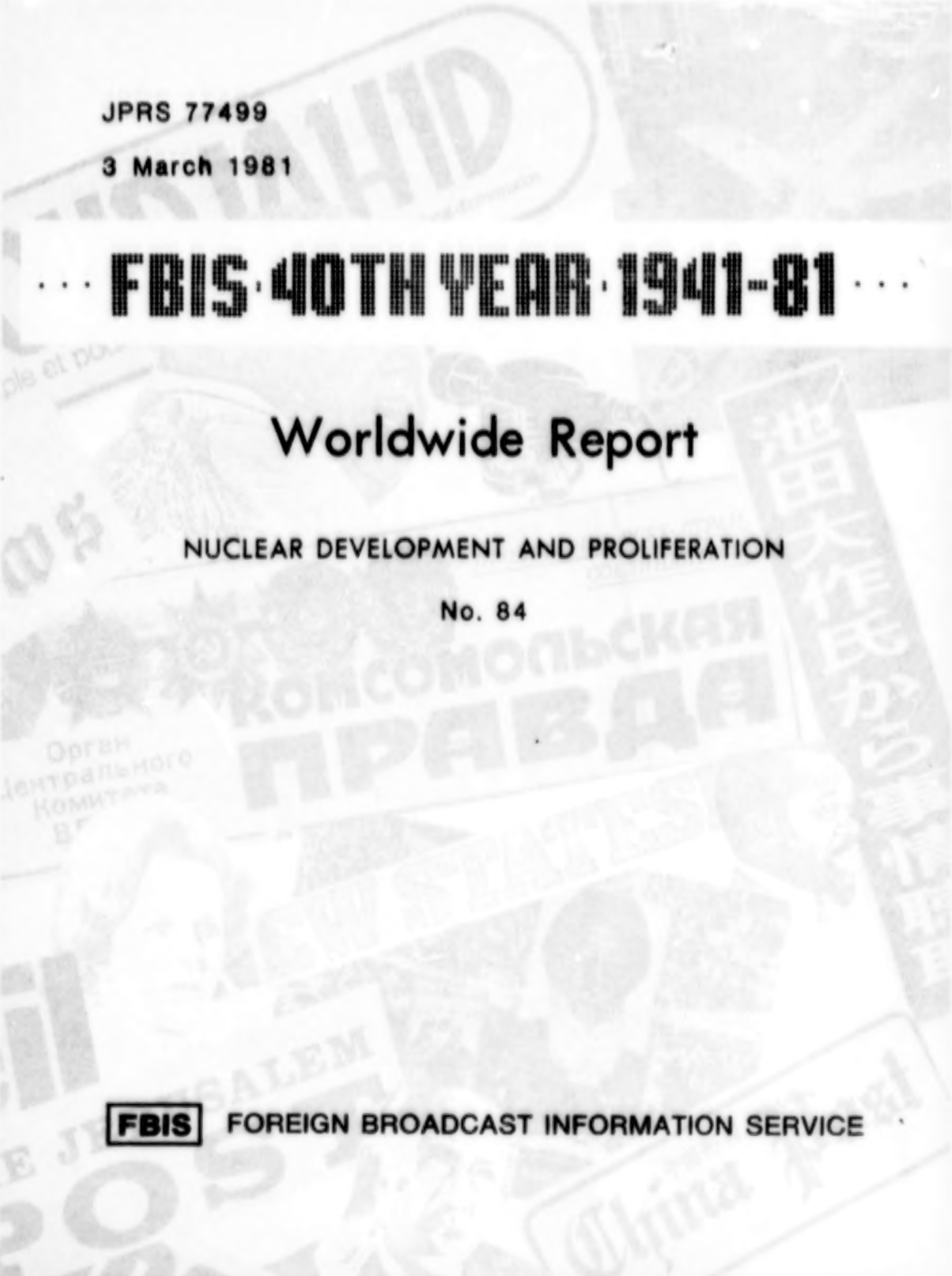
Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 84



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WORLDWIDE REPORT

NUCLEAR DEVELOPMENT AND PROLIFERATION

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EGYPT, FRANCE SIGN NUCLEAR AGREEMENT

NC122112 Cairo MENA in Arabic 2000 GMT 12 Feb 81

[Excerpts] Paris, 12 Feb (MENA)--An agreement on nuclear cooperation for peaceful purposes between France and Egypt was signed in Paris this evening. Deputy Prime Minister and Foreign Minister Kamal Hasan 'Ali signed for Egypt and French Foreign Minister Jean Francois-Poncet signed for France. The signing ceremony was held at the French Foreign Ministry.

Kamal Hasan 'Ali said: We are happy today to sign an agreement with France for the erection of nuclear reactors for electrical energy. They are of course for peaceful purposes.

He added: As we know, each plant will take 7 to 8 years to build. This is why this is an important step in and a confirmation of Egyptian-French relations as well as a factor that will strengthen and develop these relations.

Asked whether the agreement with France is considered a substitute for the agreement with the United States, 'Ali said that Egypt needs eight nuclear stations. Egypt, he added, initialed an agreement with the United States in 1975 for the import of three nuclear stations, but this agreement was not implemented because Egypt had not ratified the nuclear nonproliferation treaty. However, he said, when the People's Assembly ratifies the treaty next week we will have the opportunity to hold talks with the United States, because Egypt needs eight stations--which calls for diversification of the sources.

'Ali emphasized that the proper use of energy in development confirms and strengthens relations.

'Ali said that Egypt has allocated a part of its new oil revenues for the erection of these eight stations. Accordingly, it will be able to obtain long term-loans for this purpose from the international nuclear club.

Asked about his opinion regarding the As-Sadat-Giscard d'Estaing talks, 'Ali said that the talks were undoubtedly very successful, confirming that there was no strategic difference between the Egyptian and EC views.

CSO: 5100

NUCLEAR AGREEMENT REACHED BETWEEN FRANCE, AUSTRALIA

Geneva JOURNAL DE GENEVE in French 8 Jan 81 p 5

> [Text] Paris, 7 Jan (AFP [French Press Agency]). An agreement dealing with "nuclear transfers" between France and Australia was signed in Paris on Wednesday by Australian ambassador John Russell Rowland and Mr Bruno de Leusse, Secretary-General, French Ministry of Foreign Affairs, according to a communique released by the French Foreign Office.

The agreement is the result of lengthy negotiations and essentially spells out the conditions to be applied in case France should import uranium from Australia or in case Australia should import French nuclear technology.

French-Australian trade in this field in practice would, in the addressee's territory, be subjected to the guarantees and controls for the peaceful use of atomic energy put out by the IAEA whose headquaters is in Vienna.

The agreement furthermore allows each country to reprocess nuclear fuels produced from uranium received from the other countries. This in particular means--according to the communique--"that France can use, for its own nuclear electric program, the plutonium produced from uranium of Australian origin."

This is the first time, according to a well-informed source, that an agreement of this kind has been concluded by France. French-Australian negotiations had progressed rapidly, it was recalled, following the provision of more flexible conditions for the sale of Australian uranium, as published on 27 November by the government in Canberra.

Australia, which holds about 20 percent of the world's uranium resources, thus, according to the experts, became the first country to adopt a global policy on the controversial issue of the rights of the importing countries to use uranium and especially plutonium.

5058
CSO: 5100

BRIEFS

PHILIPPINES MAY IMPORT URANIUM FROM CANADA--The Philippines may import uranium from Canada to supply the fuel requirements of the country's first nuclear power plant now being built. This is one of the items in a package of economic development projects under negotiations between the Philippines and Canada. The Canadian ambassador met yesterday with Foreign Minister Carlos P. Romulo at the Foreign Ministry office, where they discussed proposed agreements on uranium, coal and tuna fishing projects. [Text] [HK100149 Manila FEBC in English 2330 GMT 9 Feb 81]

FRANCE TO SUPPLY EGYPT WITH NUCLEAR STATIONS--Paris, 12 Feb (AFP)--France will supply Egypt with two nuclear power stations, together with fuel and technical staff, under an agreement signed here today. The cooperation protocol, coinciding with the private visit to France of Egyptian President Anwar al-Sadat, was signed by Foreign Ministers Jean Francois-Poncent and Kamal Hasan 'Ali. Egyptian sources meanwhile said that Egypt will shortly sign an agreement with the United States for another three nuclear stations. This would follow Egypt's ratification, expected next week, of the nuclear non-proliferation treaty. Mr 'Ali said Egypt hoped to have eight nuclear power plants, each with a capacity of 1,000 megawatts, in operation by the year 2000. Meanwhile Al-Sadat, who customarily meets Jewish representatives when he visits foreign countries, this morning met a French Jewish delegation led by the grand rabbi of France, Rene Samuel Sirat, and Baron Alain de Rothschild. This afternoon Al-Sadat, met a delegation of French Moslems led by the rector of the Moslem Institute of the Mosque of Paris, Si Hamza Boubakeur. [Text] [NC121952 Paris AFP in English 1921 GMT 12 Feb 81]

FINLAND N-STUDIES FROM USSR, FRANCE—Porvoo (STT)—This January or February the IVO (Imatran Voima Oy; Imatra Power Company) will probably sign an agreement with the French and the Soviets for the initiation of a suitability study on the third nuclear power plant. The french agreement will probably be signed first according to the IVO. Among other things, the suitability study contains a technical and economic agreement on the new plant as well as part of the cost-sharing arrangements. A report on an integrated plan for the administration of Finland's energy is to be made in accordance with a Council of State decision a couple of years from now. The IVO says that on the basis of reports made to date, our country will need a big new nuclear plant as early as about 1990. [Text] [Helsinki HELSINGIN SANOMAT in Finnish 15 Jan 81 p 3] 11466

CHASMA NUCLEAR POWER PLANT--The Atomic Energy Commission has issued an invitation to submit bids for consulting and construction services relative to the building of the 600-MWe power plant of Chasma. The invitation has been sent to companies of France, Switzerland, Sweden, Belgium and the FRG. The deadline for submission of bids is not known. The work on the Chasma power plant, begun in 1974, was subsequently halted because of financial problems. The country, which lacks energy resources and is therefore highly dependent on imports, is highly interested in nuclear energy; however, there are great difficulties in the carrying out of a program. One nuclear power plant has already been built in the country; it is a 125-MWe CANDU plant located at Kanupp, near Karachi, which operates only at intervals because some parts are worn out and are not being replaced. Canada, which supplied the plant, actually imposed an embargo on the replacement parts when Pakistan refused to adhere to the safeguards imposed by it, in 1974 and 1976, on all exports of a nuclear character. The United States also, which provides military aid, does not seem disposed to furnish assistance to the nuclear program of a country that rejects the safeguards; and in Europe, there is a great deal of diffidence following the so-called Khan incident, involving the Pakistani scientist who worked in Almelo, in the Netherlands, and who is supposed to have been responsible for the leaking of classified information on gaseous centrifugation. URENCO, therefore, under pressure from the Netherlands, does not seem disposed to furnish nuclear fuel to Pakistan. [Text] [Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian Vol 26, No 8-9, Aug-Sep 80 p 23]
11267

CSO: 5100

BRIEFS

INDO-INDONESIAN NUCLEAR PACT--Bombay, January 9, (PTI): An agreement of cooperation between the governments of India and Indonesia on utilisation of nuclear energy for peaceful purposes was signed here today. According to an announcement from the atomic energy commission the agreement was signed by the commission's chairman, Dr. H.N Sethna, and director-general of the Indonesian atomic energy agency, Dr. A. Baiquni, on behalf of the two countries. [Text] [Bombay THE TIMES OF INDIA in English 10 Jan 81 p 1]

CSO: 5100

SCIENTISTS STRIKE AGAINST ATOMIC ENERGY COMMISSION

Commission Press Release

Dacca THE BANGLADESH TIMES in English 5 Jan 81 p 12

[Text] The Bangladesh Atomic Emergy Commission (BAEC) has called upon its striking scientists and technologists to resume their duties immediately in "the enterest of the nation" as well as "in their own interest". [as published]

The Commission, in a Press release issued by its Secretary Mr M A Rauf, on Sunday said that the Government was fully aware of the problems faced by the scientists and technologists of BAEC, who are on strike since September 5, 1980.

The Press release pointed out that a number of steps had already been taken for solving the problems of the BAEC scientists and technologists.

It regretted that "they went on strike at a time when progress was made in respect of solution of the problems and results were about to be achieved. The strike caused great harm to the research and development programmes off BAEC a delayed installation of research reactor and the computer resulting in heavy loss to the nation'. [as published]

"The scientists are assured that their problems are receiving sympathetic consideration and positive decisions taken so far can be implemented immediately on their resumption of duties", it added.

Strike Settled

Dacca THE BANGLADESH OBSERVER in English 7 Jan 81 p 1

[Text] The scientists of Bangladesh Atomic Energy Commission have decided to call off their sixteen-week long strike and resume duties from today (Wednesday), a BAEC Press release said in Dacca Tuesday night, reports BSS.

The strike has been called off on the basis of a "satisfactory understanding" reached between the authorities and the Atomic Energy Scientists Association, the Press release added.

The understanding was reached Tuesday night through discussion among Dr. R. A. Ghani State Minister for Science and Technology, Dr. Anwar Hussain Chairman Bangladesh Atomic Energy Commission and Dr. M. Ahsan Chairman of Bangladesh Atomic Energy Scientists Association.

The Press release was jointly signed by Dr. Anwar Hussain and Dr. M. Ahsan.

CSO: 5100

ATOMIC ENERGY PROGRAM SHOWPIECE OF INDIAN RESEARCH, DEVELOPMENT

Madras THE HINDU in English 24 Jan 81 p 24

[Text] IT is not an accident that amongst the various sector-wise programmes outlined in the "Draft Science and Technology Plan (1974-79)" from NCST in 1973, the only two sectors that came anywhere near fulfilling the Plan were the Atomic Energy and Space. It is also no accident that the two—and the only two—major technological successes in India namely the atomic explosion at Pokhram and the successful launching of the Indian satellite were from these agencies.

Competent and efficient management was certainly one of the reasons for the relative success of these two departments. But much more important and critical were other reasons which relate to their primary mission and associated characteristics.

First, both atomic energy and space were, and are, considered items of strategic importance and closely related for a long time under a single unit. It was only in 1972 that the space programme of the country which till then had been under the DAE, was formed into a separate department under the Prime Minister.

As a result of this perception of these two items as matters of strategic importance, they were also accorded priority on budgetary allocation. These two together accounted for about 40 per cent of the total R & D expenditure of all scientific agencies in 1976-77.

Secondly, both the departments were given tasks within a narrow field. Their mission were quite limited. DAE was concerned with Atomic energy and "the principal objectives of the space programme in India are to develop indigenous competence for designing and building sophisticated hardware involved in space technology." Apart from electronics, space and Atomic energy, there is no other sector in India which has a single apex body concerned with the development of that sector.

Thirdly, both atomic energy and space were isolated from the rest of economy. They were not manufacturing units interacting with the rest of the industry except in so far as equipments and components were procured. They were the generators and users of their technology. There was no compulsion and need to look for external producers to produce and market their products in a competitive fashion. Their only attempt to go into market—the case of the Power projects Division of the DAE—has not been a shining example. The project delays and cost increases are reminiscent of any number of public or private sector projects in other spheres of the economy.

Fourthly, cost-benefit analysis were largely absent in the review of these agencies work because of the nature of the work involved. Moreover since they were the sole units involved in this work in India, comparative costs with other units could also not be made.

In contrast to this, almost every other sector in India, as shall be discussed later suffers from spurious and ill-conceived cost-benefit studies in their attempts to achieve self-reliance. If only the Government had taken up the cause of other sectors such as fertilisers, power or chemicals, half as zealously as they had done on behalf of space or atomic energy, the results would have been doubly successful if not as spectacular.

In terms of their influence the results of the R & D expenditures on these two sectors have not been very much successful. The only manner in which they could influence the rest of the industry was through their procurement of goods and components and the transfer of technology.

The very nature of the work of DAE and DOS requires the supply of quality high-technology items. Much of the items that are delivered from the industry—both private and public—to DAE and DOS are those that are produced under collaboration. Only by classifying items fabricated under licence from imported raw materials and components as indigenous equipment can one arrive at estimates of 90 per cent indigenisation in nuclear power plants or space vehicles.

One another indicator of the influence of these procurement policies would be the extent to which equipment and materials supplied first to DAE or DOS according to their exact standards later on become part of the general industrial output to other users. Unfortunately figures are not available on this score.

As far as technology transfer is concerned, the picture is not any brighter. The major effort at technology transfer from DAE took place when ECIL was formed as a separate public sector undertaking under DAE. ECIL was then staffed by DAE personnel and their product line reflected the expertise and experience which DAE had built up till then as part of its research activities. Apart from this, the amount of technology transfer that has taken place from DAE to industry, especially private industry has been minimal.

It is quite likely that the current production in Indian industry of products arising out of DAE's R & D efforts and the resulting transfer of technology amount to less than that of the efforts of CSIR laboratories. Unfortunately no precise figures are available on this count. The position would not be that much different in the case of DOS. Notwithstanding its spectacular successes, its impact on the industrial scene has been minimal. Inspite of the presence of an active and apparently enlightened transfer of technology unit at ISRO, the results have not been very encouraging.

Where does all this lead to? Should we then scrap our atomic energy and space programme? Certainly not. Nuclear power is likely to be the dominant source of power in India by the early 21st century and it is necessary that enough infrastructure is built by then to achieve any degree of self-sufficiency.

On the other hand, it is equally necessary that sufficient attention be paid to other aspects of nuclear power—as in other power-generation such as material technology, heat-transfer system, generating systems and so on. As far as space programme is concerned, the technology transfer to industry will nearly always be through "spin-off" technologies and even in the most advanced economies, there has been very little attempts at serious evaluation of the spin-offs of space programmes.

Thus any attempt to evaluate the space programme must be made on its merit of having achieved the objective of "developing indigenous competence for designing and building sophisticated hardware involved in space technology" and not in "how far it has reached the very doorsteps of the common people" through spin-offs.

CSO: 4220

ERRATIC POWER SUPPLY CAUSES PROBLEMS FOR ATOMIC RESEARCH CENTER

Calcutta THE STATESMAN in English 29 Jan 81 p 9

[Text] Erratic power supply has created serious problems for the Variable Energy Cyclotron Project at the Bhabha Atomic Research Centre at Salt Lake. It has to spend Rs 16,000 daily for buying diesel for its generators. Proposals for its expansion have been ruled out bacause of the power situation. [as published]

Uninterrupted supply of power for 10 to 12 hours daily is essential for the project. Since 1976, the Atomic Energy Commission authorities have repeatedly requested the West Bengal Government to ensure such supply. But this has not been possible. The requirement is between five and six MW of which half a MW is consumed by the 88" diameter magnet of the cyclotron. Eventually, four diesel generators were installed and since the middle of last year, Rs 16,000 has been spent daily for procuring diesel.

Power is also needed for water treatment, water cooling, airconditioning and minor magnets of the cyclotron. Running diesel generators has created other problems. Large underground reservoirs had to be built. Scientists are also concerned over the possibility of pollution.

It had been thought, at one stage that the cyclotron would be the nucleus of a developing accelerator technology, and research facilities at the centre would be expanded. But at meetings of the Atomic Energy Commission and the National Accelerator Committee, this was ruled out subsequently because installation of bigger machines would add to the demand for power.

Professor Abdus Salam, who visited the centre, also called for its development. He said accelerator technology was important not only for basic research but also because of its "technological fallout" which would benefit ancillary industries. In fact, scientists say its uses could be extended even to medical science.

Scientists at the centre find the situation disheartening. About Rs 15 crores have so far been spent for the centre and, they had hoped it would be no problem to procure more funds and to develop it so that in future, they could go into superconducting technology. But the erratic supply from the State Electricity Board has blighted their hopes.

CSO: 5100

BRIEFS

KOTA ATOMIC UNIT--Jaipur, January 28--Unit No 1 of Rajasthan atomic power project at Kota, which was shut down on December 18, started functioning at 5.25 p.m. today. [Text] [Bombay THE TIMES OF INDIA in English 29 Jan 81 p 9]

CSO: 5100

BRIEFS

URANIUM DEPOSIT DISCOVERY--Beijing, 12 Feb (XINHUA)--The 9th company under a certain unit of the PLA Capital Construction Engineer Corps has discovered and verified a medium size deposit of uranium ore 2 years ahead of time, saving more than 7 million yuan of state funds. It usually takes about 6 years to verify a medium size uranium deposit. By constantly raising its drilling efficiency, the company completed the task for the state in only 4 years, which represents an outstanding performance by China's uranium geologists. [Beijing XINHUA Domestic Service in Chinese 1243 GMT 12 Feb 81 OW]

CSO: 5100

NUCLEAR PLANT DESIGNED TO RESIST EARTHQUAKES, ERUPTIONS

Kuala Lumpur BUSINESS TIMES in English 8 Jan 81 p 6

[Article by Adlai J. Amor in Manila]

[Text] THERE seems to be no more major obstacle to the completion of the Philippines' controversial — and first — nuclear plant.

Even a case filed before the First Federal Court of Washington D.C. to nullify the export license issued by the US Nuclear Regulatory Commission did not stop the shipment of the nuclear reactor to the Philippines.

The major components — the coolant pump, the pressuriser, the reactor and the steam generator — are already here and the other parts are expected before the end of the year.

"There are no more major impediments to the completion of the nuclear plant," said Jose V. Jovellanos, senior vice-president of the National Power Corporation (NPC), the government agency handling the nuclear plant.

The Philippines' first nuclear plant, with a 620 megawatt capacity, is located in Morong, Bataan, 115 kilometres north east of Manila. Original plans called for two reactors in the same site — the first in the "nest" of 11 nuclear plants in the Philippines' largest island, Luzon — but escalating costs have forced the government to shelve the additional plants.

The nuclear plant, which was originally priced at US$1.2 billion, is now expected to cost US$1.9 billion — the most expensive project of the Philippine government. When finished by 1985, it will only provide 6.4 per cent of the country's needs.

The nuclear plant is being built by Westinghouse Electric Corporation, while various aspects were sub-contracted to the companies of Herminio Disini, a close associate of Philippine President Ferdinand E. Marcos.

Although public opposition to the nuclear plant has increased, it has generally been ineffective in halting the construction of the nuclear plant. Most of these opposition groups are headed by the religious and environmentalists.

They did, however, succed in suspending the construction for more than a year while a presidential commission debated on the plant's safety. The commission, however, found no cause why the Philippines should not have a nuclear plant — provided additional safety features were incorporated into the present design. Construction resumed on Sept. 26, 1980.

A total of 122 safety features were added to the nuclear plant. This prompted opposition groups to say that if so many are needed, then the plant was defective in the first place and should never be built.

"The resumption of the construction of the nuclear plant is an ill-advised decision," said former Senator Lorenzo Tanada, a staunch anti-martial law leader. "It borders on criminal imprudence."

Josue D. Polintan, manager of the NPC's nuclear power department, however said that they have been continually upgrading the nuclear plant, which was designed in 1973. "Only 21 safety features were actually added to the design after the commission's hearings," he said.

For example, NPC engineers upgraded the strength of the buildings to withstand a heavy accumulation of ashes in case the nearby two dead volcanoes will explode.

NPC engineers, however, say that a volcanic eruption is unlikely, adding that the last recorded volcanic eruption in the area occurred 69,000 years ago. But just in case, they continually monitor the dead volcanoes in the area.

The cooling tower of the nuclear plant has also been redesigned to store enough water for 30 days, just in case a tsunami (tidal wave) hits the area. The cooling water will come from the sea.

Although the nuclear plant has been built on an earthquake zone, the NPC engineers claim that it will be able to withstand any earthquake as strong as 7.9 on the Richter scale. The strongest earthquake to hit the Philippines has only been 6.6 on the Richer scale.

Mr Jovellanos of the NPC claims that when the nuclear plant will be finished, it will be the safest and most advanced in Asia.

The NPC, however, has not been able to solve the trickiest problem of all how to permanently dispose of the high-level radioactive waste.

Although a storage vault is being built under the nuclear plant, it will only hold ten years of waste. Uranium wastes, however, can remain radioactive for thousands of years.

"Within that time, we hope to find a permanent disposal site for the nuclear wastes," said Mr Jovellanos. He added that if negotiations will succeed, the Philippines will join other countries in dumping their nuclear wastes at Palmyra Island, 900 miles south of Honolulu, Hawaii.

Opposition groups also raise the question of what to do when the nuclear plant shall have outlived its usefulness in 30 years. *Ibon*, a publication of the religious activists, draws this scenario:

"Fly to the 2000's and picture the Morong nuclear plant — a monstrous monument in an eerie no-man's land, a veritable cemetary of untouchable tombs, forever radioactive."

But even while in operation, uranium to fuel the nuclear plant may be a problem. The plant is expected to consume as much as 10,000 tons of uranium up to the year 2000. Mr Polintan said it currently costs US$35 per pound but even if it increases to US$45 in ten years, it will still be cheaper than oil.

The Philippines, which has little usable uranium resources, is eyeing Australia, Gabon, the US and Canada as primary sources of uranium. The US, Canada and Australia hold 85 per cent of the world's non-communist uranium reserves. — Depthnews

CSO: 5100

BRIEFS

NUCLEAR POWER POLICY CLARIFIED--Foreign Minister No Sin-yong said on 8 February that item 10 of the Chon-Reagan joint communique, which reads "President Reagan promised that the United States will remain a reliable supplier of nuclear fuel, generating equipment and power technology" does not contradict a government policy on diversifying the suppliers of nuclear equipment. Minister No, who reported to work on 7 February for the first time since he returned with President Chon Tu-hwan from his trip to the United States, added: "It is worth noting the pertinent portion of the joint communique is being expressed in the form 'the U.S. side promised.'" [Excerpt] [SK091500 Seoul TONG-A ILBO in Korean 9 Feb 81 p 2]

CSO: 5100

INCORPORATION OF PRIVATE INDUSTRY STRENGTHENS NUCLEAR PLAN

Uranium Reserves, Development Planned

Buenos Aires CONVICCION in Spanish 22 Jan 81 p 16

[Text] A few days ago, the national executive branch released a major decree relating to the annual establishment of uranium reserves by the National Atomic Energy Commission [CNEA]. The measure cites the nuclear fuel requirements resulting from the powerplants called for in the Nuclear Plan and the projection subsequent to 1997, a period wherein it is estimated that one nuclear powerplant will have to be built per year to meet the nation's demand.

Moreover, the decree indicates encouragement for the participation of private industry in the work associated with the extraction and processing of uranium because, upon embarking on the industrial phase, the CNEA, as its head, Vice Adm Castro Madero, remarked, "has taken a step forward in its philosophy: since it has now gained experience in all the problems related to uranium mining and concentrate plants, it has decided to turn over this responsibility to private industry."

The uranium field is becoming particularly gratifying to Argentina for several reasons, an important one of which is a suspicion that the geologists have. Apparently, the Patagonian territory might contain in its depths invaluable reserves of uranium ore. This is still a supposition; on the other hand, there is no doubt about the estimate made some time ago: the proven reserves amount to 27,000 tons, and the total estimated reserves would total about 450,000 tons, reckoned on the basis of a territory with a geological potential for containing uranium exceeding 60 percent, a territory covering approximately 400,000 square kilometers.

As for the activity being carried out by the CNEA in ore prospecting and extraction, it is not an exaggeration to say that this is one of the sectors that has brought the most satisfaction recently, despite the scanty information supplied by the entity. The success achieved from a technical standpoint and in cutting costs has enabled the CNEA to progress along the line voiced by its head, favoring the incorporation of private industry in the uranium field. The development of the large Sierra Pintada deposits (with a capacity for 14,000 tons) and the Los Gigantes deposits (2 million tons) will be undertaken by private consortiums, which will deliver the "yellow cake" or purified uranium concentrate to the Commission. The product of the two deposits will be combined at the two uranium dioxide plants that are being built which, when added to the fuel element plant, will provide the fuel for the nuclear powerplants.

Added to all this are the steps being taken to complete the final phase of the nuclear fuel cycle: the reprocessing, a heated issue but one which, as Vice Adm Castro Madero explained, relates to a "very important part of the fuel cycle, that is essential for coming out on the Latin American market as exporters of nuclear technology, one of Argentina's future goals."

The country's uranium potential and the geological possibilities that have been estimated and that remain to be estimated allow us Argentines to be highly optimistic about the course of action to establish an ambitious nuclear powerplant plan, as well as opening the door for our conversion into a uranium exporting country.

Nuclear Powerplant Progress Cited

Buenos Aires CONVICCION in Spanish 2? Jan 81 p 16

[Text] With the creation of the Argentine Nuclear Electric Powerplant Enterprise (ENACE), a mixed company with a state majority share, Argentina completed last year, at least in principle, all the fundamental requirements for gradually taking charge of the construction and subsequent operation of nuclear plants using its own facilities.

Although local industry had a share in many secondary or supplementary sectors of the construction of the Atucha I powerplant (the first nuclear powerplant built in the country, and also the first in Latin America), and an even greater share in the case of Embalse (which will open within 2 years), it will not be until the construction of Atucha II that native engineering and industry will have a highly significant share, which will increase steadily as the other three nuclear powerplants planned start to materialize.

In March of last year, the country took another major preliminary step in its policy aimed at achieving self-sufficiency in the area of nuclear energy development, with the signing of the contract between the National Atomic Energy Commission and the Swiss firm Suizer Brothers, Ltd, for the construction of the heavy water plant in Arroyito, in Neuquen Province. The plant will have a capacity to produce 250 tons of heavy water per year, and has been especially designed to supply the four powerplants in the Nuclear Plan. The first in that series of four powerplants will be the Atucha II, whose opening is scheduled for 1988; followed by the Cuyo nuclear powerplant which should open in 1991; and, 4 years later, that is, in 1995, the NOA (Northwest Argentine) powerplant. In 1997, the last one in this program, the Bahia Blanca powerplant, is due to open.

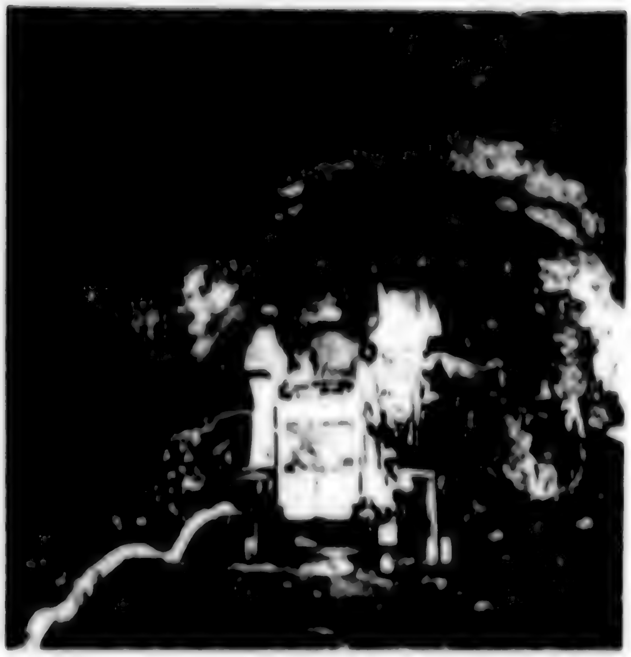
The Arroyito plant, including the infrastructural work and the housing district, will entail an investment of $400 million. This plant will be followed by the construction of another one, initially of an experimental type, which will later be expanded to produce an additional 80 tons of heavy water per year, thereby insuring self-sufficiency in this category. This second heavy water plant will be constructed entirely by native industry.

The operation of the nuclear powerplants using natural uranium (the type adopted by Argentina), to avoid any dependence on foreign countries, requires the development of the respective technology for the production, first, of the fuel; in other words, the natural uranium cake that is obtained from the uranium ore extracted from the deposits; second, of the casing in which the uranium cake is placed, the manufacture of which entails the mastery of a particular type of metallurgy; and, third, of the heavy water, which differs from ordinary water in that the ordinary hydrogen has been replaced by deuterium, or heavy hydrogen. The experts of the National Atomic Energy Commission have resolved these three technical "knots," which means that the country is in a position to continue the development of its program for the construction of natural uranium nuclear powerplants without depending on supplies from abroad in these three key areas, as has been the case up until now.

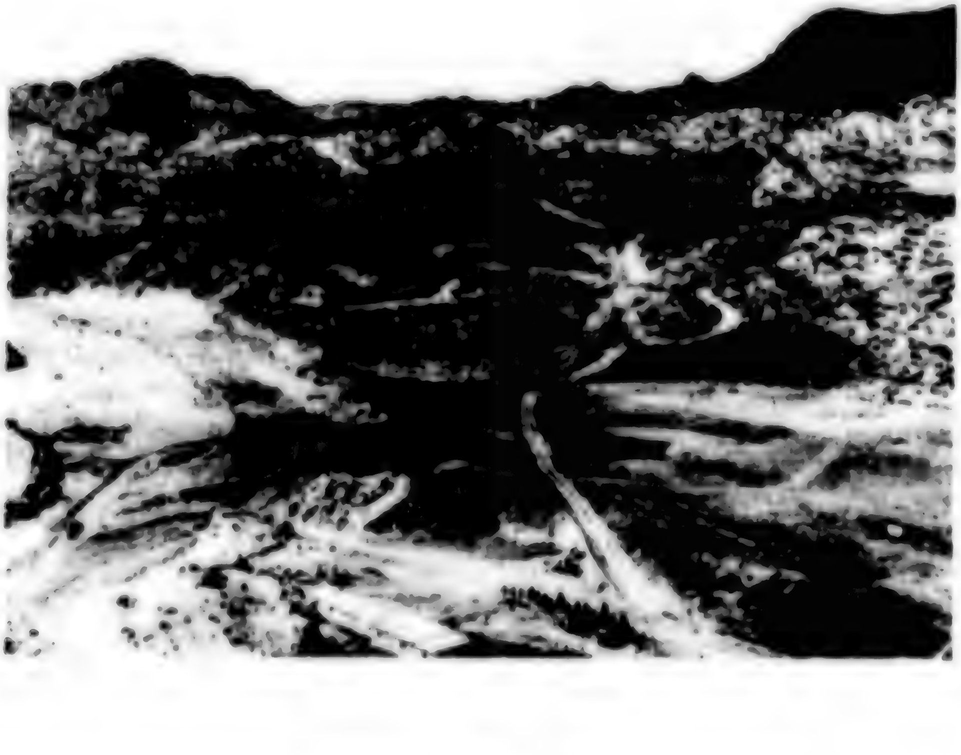
With the recent creation of the ENACE, the goals of which include giving an impetus to the participation of native private firms both in providing components for the powerplants and in supplying services, Argentina has resolutely embarked on the final stretch of the road that will lead it to acquire the necessary capacity for undertaking the design and construction of its own nuclear powerplants. Added to this is the fact that the country has at its disposal sufficient uranium reserves to insure the normal operation of its powerplants, without having to depend on imports in this area either.

Furthermore, it should be stressed that the success gained by Argentina in the technological field with respect to nuclear energy and other areas of peaceful uses of the atom simultaneously signifies a considerable political victory: that of protecting the national interest when confronted with governments which have chosen to refuse the transfer of technology which could make possible nuclear development for peaceful purposes, something clearly essential to spur on the growth of the non-industrialized or insufficiently industrialized nations. The Carter government established a genuine embargo on the transfer of nuclear technology, replacing the system which, for 2 decades, had made this type of transfer possible under a group of safeguards designed to precent that technology from being used for military purposes.

The so-called Nuclear Nonproliferation Treaty, under the slogan of which it was attempted and is still being attempted to prevent the developing nations from having access to nuclear technology for peaceful purposes, with the excuse of the threat of war that it would represent, has not been signed by Argentina. The country considers it discriminatory and at odds with the principle of legal equality of all states, inasmuch as it imposes different responsibilities and different rights for nations, depending upon whether or not they have a capacity for manufacturing nuclear weapons. The Carter government even refused to provide the necessary technology for the production of heavy water, which is essential to the operation of the natural uranium plants, the system adopted by Argentina; and that and other similar problems were finally resolved with Switzerland and West Germany, solutions which that government also attempted to block, but in vain. With all those political obstacles surmounted, Argentina is continuing its progress toward the attainment of its irrevocable goal of achieving nuclear development for peaceful purposes, and its program for the next 18 years calls for an investment of $10 billion.



Interior of the Don Otto uranium mine



Sierra, Pintada, Argentina's largest uranium deposit

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ARGENTINA

BRIEFS

SECURITY SYSTEM AT NUCLEAR PLANT--Buenos Aires, 4 Feb (NA)--The consortium made up of the Argentine company "Autotrol S.A." and the U.S. company "Wakenhut" was granted a contract worth over $7 million for the installation of an electronic security system at the nuclear plant which is being built at Embalse Rio Tercero, Cordoba Province. The information was supplied by a spokesman of the National Atomic Energy Commission [CNEA] who stated that seven international firms were present at the bidding and that the contract with the selected consortium was signed by the middle of last week. The "Wakenhut" company has installed electronic security systems, similar to those to be installed at the Embalse Rio Tercero nuclear plants in the United States, the Netherlands, Belgium and Italy, said the spokesman who asked not to be identified. [Text] [PY051140 Buenos Aires NOTICIAS ARGENTINAS in Spanish 2340 GMT 4 Feb 81]

CSO: 5100

OBJECTIVES OF NUCLEAR PROGRAM QUESTIONED

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 25 Jan 81 p 49

[Article by Jose Goldemberg: "Nuclear Program is Surrounded by Suspicion"]

[Text] Since its beginning in 1975, the Brazilian Nuclear Program has been surrounded by suspicions that it is basically meant for covering up the production of atomic bombs, leading the country to join the small Atomic Club.

The idea dazzled some military men, who saw in that an increase in the regional and international importance of Brazil, particularly since near to us Argentina appeared to share similar ideas, competing with us.

Moreover, it captured the imagination of Itamaraty, which saw in the nuclear agreement with Germany a possibility for self-determination of the country against the pressures of the United States. American policy on providing nuclear technology and materials is in fact so restrictive that to remain limited to that supplier would mean basically the acceptance of a "colony-mother country" relationship.

Other than those two groups, there are some engineers of ELETROBRAS [Brazilian Electric Powerplants Inc] and technocrats of the Ministry of Mines and Energy who are fascinated by the nuclear technology skillfully promoted by manufacturers of various countries and by the International Atomic Energy Agency.

Such a combination of interests concluded by convincing President Geisel in 1975 that he should abandon a very close partnership with the Americans--which would not lead to nuclear independence--and to seek in Germany a partner who would provide us with nuclear reactors and the technology that comes with them, eventually giving Brazil "complete knowledge of nuclear technology," including the possibility of producing nuclear weapons.

The Germans played Brazilian interests and dreams skillfully and obtained the signing of what was called the "deal of the century," involving the sale of eight nuclear reactors under a plan of progressive national operation involving total expenditures of nearly $30 billion.

From 1975 to now, the subject was widely discussed and, we believe, much better understood by the majority of government observers and authorities. It was thus made very clear that the haste for nuclear reactors in Brazil is debatable in view of the other choices existing for generating electricity (hydroelectric and coal-fueled thermoelectric powerplants); the extremely high costs of the nuclear program, which makes it incompatible with the economic difficulties the country is undergoing, and that it is unlikely that the technology necessary for our "nuclear independence" would in fact be transferred by Germany to Brazil.

In view of this picture, the nuclear program was adapted to the national situation with the installation date of the eight nuclear reactors first being extended from 1990 to 1995 and now to the year 2000.

With that step, reason prevails once more from the technical and economic point of view, in that very confused area. With the extension of the timetable, the path is opened for an in-depth renegotiation of the agreement with Germany, guaranteeing a greater national participation by industry, scientists and technologists. Moreover, that should be done with the Angra dos Reis reactors, which should be converted into the "great school" for the transfer of technology before greater commitments for other reactors are made.

The question to be asked, however, is whether the military point of view has once more prevailed. Will some groups desist from the possibility of producing weapons?

What is happening here is a "one of a kind" situation: The path followed by the Geisel Administration to lead us to nuclear independence (and possibly to weapons) was a mistaken path, it being surprising that many people in the government allowed themselves to be led along it. The most direct, expeditious and proper path for making nuclear weapons is by means of small nuclear reactors producing plutonium (which generally do not produce electricity). Not only did the United States do this long before it had a nuclear industry for producing commercial nuclear reactors, but it was also the course followed by India and, according to all indications, by Israel, which used a research reactor for this purpose. Communist China and South Africa enrich uranium for making weapons with technologies to which Brazil does not have access.

The idea of first installing a "civilian" nuclear industry and later using some of the materials for military purposes is not a widespread idea in the world unless it is because of the fact that in the operation of commercial reactors (and the knowledge of the fuel cycle) many techniques necessary for military purposes are developed.

The great powers took steps to prevent that and today it is practically impossible to misroute nuclear materials from civilian to military purposes. Despite all its nationalism, the Geisel Administration gradually signed such safeguard contracts (nuclear safeguards) so that today the nuclear program is practically under the supervision of the IAEA and cannot be used for military purposes.

If at any time there were strong military interests in the Brazilian Nuclear Program, they have been superseded because it will not be in this direction that "nuclear independence," the rhetorical argument for the program at its beginning, will be achieved. This may be clearly seen in the recent agreements which NUCLEBRAS [Brazilian Nuclear Corporations] signed with the French firm UPUK for the production of uranium hexafluoride, which will remain under "safeguards," as will "subsequent production of nuclear or fissionable materials obtained from uranium hexafluoride from France or produced in Brazil."

There is a complete lack of clarity on government objectives here. It seems that many technocrats and military men apparently were, and continue to be, deceived as to the true possibilities of nuclear energy (for civilian as well as military purposes) in the country and they should be enlightened quickly.

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PROFESSOR POINTS OUT SHORTCOMINGS OF NUCLEAR PROGRAM

Sao Paulo FOLHA DE SAO PAULO in Portuguese 24 Jan 81 p 15

[Article by Igor Veltman: "Professor Analyzes the Nuclear Sector"]

[Text] The main shortcomings and distortions in the development of national nuclear technology are due basically to the almost total lack of specialists in the area, the result of the vacillation of the government, which since the middle of the decade of the 50's has hesitated in clearly establishing a nuclear policy for the country.

That is the opinion of Professor Ivo Jordan, head of the Physical Chemistry Department of the Institute of Chemistry of Sao Paulo University. In his opinion, the lack of a graduate course in the nuclear area up to now demonstrates the low priority established in Brazil until recently for the sector. Professor Jordan believes that the lack of a job market capable of absorbing possible graduates in nuclear engineering has led to the situation in which training of specialists has been practically reduced to the professionals from the programs contracted with NUCLEBRAS [Brazilian Nuclear Corporations].

Overcome Deficiencies

Professor Ivo Jordan defended the nuclear program established in 1975 by the Ernesto Geisel Administration with the signing of the Brazil-Germany Nuclear Agreement. He believes that the secret nature of the agreement, which did not go through an analysis of the areas involved in nuclear research, does not impugn its legitimacy. Even the high cost of power generated by Brazilian reactors is something secondary in his opinion. "Actually the nuclear kilowatt-hour is more expensive than the hydroelectric, but that has been known among specialists in the area for a long time. However, Brazil needs nuclear reactors, not so much because of the generation of electric power by them but because of the introduction of an industry of highly advanced technology required for their installation."

Professor Jordan believes that the country will be able to make up for shortages and even replace imported products after the development of new industrial areas aimed at producing metallurgical, chemical or electronic components for the atomic powerplants. As an example, he mentioned fluorated compounds, for which Brazil depends completely on imports, and which must be produced in order to supply yellow cake (name for the blocks of enriched uranium) to the enrichment plants.

Enrichment of Brazilian uranium will be done in a plant under construction at Rezende in the state of Rio de Janeiro. However, Professor Jordan, who has been involved in research on the separation of Uranium 235 and Uranium 238 since 1958--his doctorate thesis was based on 8 years of work in the Technological Research Institute (IPT) on the use of the centrifuge technique for uranium enrichment--does not have any great information on the processes developed by NUCLEBRAS. "It is a company which does not take much interest in exchanging ideas in that respect," says the professor ironically.

Delay

Decisions on the use of the jet centrifuge technique for the enrichment of uranium or even the decisions for the signing of the Brazil-Germany Nuclear Agreement, in the opinion of Professor Jordan, could not have been made in a public debate. "We suffer a great disadvantage because of a lack of definition on a nuclear policy, a problem that has existed since 1956. While other countries were debating, for example, over whether to use enriched uranium or not, without for a moment neglecting the development of their nuclear programs, we spent years arguing about options without knowing what the decision would be and without making any plans," he declares. In his opinion, even though public opinion may be against nuclear energy, that should not lead to a halt in research in that area.

Uranium Enrichment

The technique of enrichment by jet centrifuges selected by NUCLEBRAS for the production of nuclear fuel materials, is the most expensive from the point of view of the consumption of energy, declares Professor Ivo Jordan. While gaseous diffusion, employed initially in the United States, uses about 2,400 kw/hr per Separative Work Unit [SWU] and the centrifuges used by Germany, England and Holland use only 200 to 300 kw/hr/SWU, the jet centrifuges chosen by Brazil consume between 3,200 and 4,000 kw/hr/SWU. The SWU is the unit of production of enrichment plants.

Enrichment of uranium, explains Professor Jordan, is similar to the distillation of alcohol, since it is the separation of an isotopic mixture, in this case the mixture of U235 and U238. Only U235 is used for the generation of nuclear energy and it is present in a proportion of nearly .7 percent of the original mixture.

By means of successive separations using membranes (gaseous diffusion), centrifuges or the passage of uranium hexaflouride gas through centrifugal channels, the concentration of U235 increases. That concentration at each stage is almost imperceptible, which makes repetition of the process necessary until a proportion of 3 percent is attained in almost 1,400 stages. To attain the proportion of U235 necessary for the military use of atomic energy, according to Professor Jordan, it is necessary to pass through 14,000 stages, with an enormous consumption of energy.

Espionage

"Energy is used in such an amount that the United States was able to estimate the number of atomic bombs produced by China by means of simple aerial photographs of the electric cables feeding the Chinese enrichment plants. The thickness of the cables indicated the energy used and the amount of uranium being enriched--the first step for discovering the military potential," said Professor Jordan.

Despite the fact that it uses almost twice as much energy than the gaseous diffusion method and scores of times more than the centrifuges, the jet centrifuge technique represents a saving in the uranium enrichment plant because it does not require mobile installations or more sophisticated material for the operation, adds the professor. The separation of U235 is done in channels molded into metallic material which direct the uranium hexafluoride gas to millimetric wedges where the lighter U235 and the heavier U238 separate naturally.

Research

Enriched uranium from the separation of U235 and U238 goes to the reactor where it will be turned into uranium oxide, the fuel material which is placed in the elements of the reactor, generally in the form of pellets, explains Professor Jordan.

Research now being made in the area of uranium enrichment, he explains is aimed particularly at lowering the levels of energy consumption in the compressor and in the forcing of uranium hexafluoride through the channels, another energy-using factor. The Rezende plant should produce nearly 70 tons of enriched uranium per year, on a scale of 200,000 SWU (demonstration plant).

Professor Jordan says: Enrichment will be done initially in a demonstration plant so that the parameters of economic feasibility may be established with certainty, something that is uncertain until production is begun. Afterward it will be necessary to build other plants or expand the one at Rezende, because its production will only be enough to supply one medium reactor per year."

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BRAZIL

YELLOW CAKE PLANT MAY BEGIN OPERATIONS IN 1986

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 23 Jan 81 p 25

[Text] Minister of Mines and Energy Cesar Cals should receive the conclusions on the mineralogical research work accomplished at the Itataia Ranch in Santa Quiteria, 170 kilometers from Fortalez, where the largest and most important uranium deposit of the country is located, before the end of the month. Based on those conclusions, which are "very optimistic," according to technicians, NUCLEBRAS [Brazilian Nuclear Corporations] will begin studies for the installation of a yellow cake plant. The installation of that mining-industrial complex will create between 600 and 800 new direct jobs in the plant and nearly 300 jobs at the deposit.

In an interview granted to ESTADO, NUCLEBRAS Director John Milne Albuquerque Forman denied that work in Itataia had been halted. He explained that "the decline in the rate of work at the site of the deposit does not mean that there has been a halt. What is happening is that at a certain point in research work it is necessary to intensify laboratory tests outside the site." The deposit at Itataia is the largest uranium reserve in Brazil, repeated Forman, saying: "For that very reason NUCLEBRAS treats it as being 'highly important.'"

Forman added: "The planning and construction period for the plant could allow the beginning of production in 1986, once it is economically justified in terms of uranium consumption stipulated by the Brazilian Nuclear Program and decisions are made as to the exporting of mineral products." Keeping in mind the existence of phosphate associated with uranium, NUCLEBRAS has made an agreement with PETROFERTIL [expansion unknown] for the industrialization of phosphated products.

According to uranium concentrate production capacity, which at the end of the studies should be from 500 to 1,000 tons of uranium per year, the 122,500-ton reserve of U308 insures the installation a useful life of up to 150 years. Ceara, therefore, unless new discoveries "as promising as this one" are made, will become the mineral state of the country or even the "uranium capital of the hemisphere." In view of the excellent mineralogical prospects of Ceara, Governor Virgilio Tavora should announce the creation of PROMINAS, Mine Program, within a few days. It will seek to identify the entire mineral potential of the state.

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ANGRA I TO BEGIN OPERATIONS IN APRIL; STORM DAMAGE ASSESSED

Sudden Storm Strikes Area

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 28 Jan 81 p 23

[Article by Tarcisio Baltar: "Angra I Will Go Into Operation 1 April"]

[Text] The first Brazilian nuclear powerplant, Angra I, will begin to operate in April after successful preliminary tests (call "hot tests") are concluded. Giving that information to ESTADO yesterday, the construction superintendent of the Angra dos Reis nuclear powerplant, Engineer Alceu Braga Lopes, explained that the beginning of permanent operations by Angra I will begin with the loading of the core, that is, with the placement of uranium pellets in the core of the powerplant.

After that, the Furnas Electric Powerplant System [FURNAS] will deliver power from three sources to distributing companies such as Light (Rio and Sao Paulo): hydroelectric, thermoelectric and nuclear. As far as the consumer is concerned, the power remains the same regardless of the source, since it will be electric power whether it is produced by waterpower, petroleum or atomic fission.

Engineer Alceu Braga Lopes made it a point to state the month in which the Angra I core will be loaded to make it clear that the sudden storm which hit Praia de Itaorna and vicinity from 1900 Wednesday to 0200 Thursday morning in no way affected the timetable of the nuclear program, despite the fact that it blocked the Rios-Santos highway at three places in the area near Itaorna (which could have delayed the transportation of material to the Angra II site), because quick action by FURNAS personnel prevented it.

At the Time of the Soccer Game

The rain began to fall heavily at the time when the construction superintendent and other technicians were going to begin the regular Wednesday "sandlot soccer game" at the small soccer field of the village area of Praia Brava. Analyzing the consequences of the storm, Braga Lopes and his team arrived at the following conclusions:

"A. Damage to the work area of the site: In the area of the Angra I powerplant, absolutely none; in the area of the Angra II powerplant, as in all periods of rain (particularly the last rain which was of greater intensity) there was flooding of the areas where excavations exist, which means in the area of the piles that will serve as a foundation for that powerplant.

"B. Damage to the highway (BR 101, the stretch between Rio and Santos): There were slides at three banks between Itaorna (the site) and Praia Brava (one of the villages for project personnel). The road was closed from 0300 Thursday morning (the slides took place after the rain) until 1200 of that same day, when there was a partial clearing of the road.

"C. Damage in Praia Brava: The banks which collapsed in the Praia Brava area, blocked the two large drainage canals of the residential village, causing flooding in some parts of the village. Two or three areas had 60 centimeters of standing water, which reached the first floors of 50 houses soaking furniture and other objects. Some automobiles were damaged by the water and one was hurled into the canal.

"D. Damage in Vila do Frade: In the workers camp under construction there was no damage but on Portugal and Cunhambebe Streets, traditionally flooded because they are in a sort of ravine where the runoff from the hills collects, flooding reached a depth of 1.5 meters. Those two streets have nothing to do with the project or with the personnel of the powerplant."

The Moment of Truth

The report by the construction superintendency of the Angra dos Reis Nuclear Powerplant is of interest to all those who may visit the area of the nuclear powerplant and the residential villages. Actually, in the work area the water flooded the area of excavations, where the piles which will serve as the foundation for the Angra II Powerplant are still partially visible. Since the intensity of the rain was greater than that of the storms which strike the region, an extra day and a half was required for pumping out all the water, a task which usually takes five or six hours.

There is no more water in that flooded area but there remains a 50-centimeter layer of mud on the filled area around the pilings. That, however, according to Braga Lopes, in no way changes the progress of the project. In the area of the Praia Brava Village, not only were the 50 houses mentioned before damaged but the torrents which came down from the hill completely destroyed a playground, the underground sewers and a clay soccer field. The foundations of the club frequented by the community were greatly damaged and are exposed and weakened in the front part of the building. A soccer field, precisely the one in which the construction superintendent and other technicians were beginning their Wednesday game before the great rain, also suffered very serious damage.

Outside the area of the worksite, the villages and highway, it is noted that there were many landslides in the higher areas overlooking the beach at Itaorna and neighboring area. From afar could be seen, in the forest areas not yet violated by man, stretch after stretch of forest where cave-ins had downed trees and stirred up the red clay which prevails in the region.

The interesting thing is that the rain was much more intense in those areas than in the Municipality of Angra dos Reis 30 kilometers away. Yesterday there remained no signs of the storm in that city, while in the area of the plant itself and in the villages the effects of the storm were visible at first sight.

Powerplant To Use 30 Percent of Power at First

The Angra I Powerplant, the first in Brazil to go into operation sometime in April, has an installed capacity of 626 megawatts. At first the powerplant will produce at a rate of 30 percent of installed capacity, progressively increasing its production, depending on the final safety tests, but never exceeding 80 percent of capacity.

At 220 kilometers from Sao Paulo, 130 kilometers from Rio and 350 kilometers from Belo Horizonte, the Angra I Nuclear Powerplant is part of the Almirante Alvaro Alberot Nuclear Complex, which will also have the units known as Angra 2 and 3. Angra 1 is not included in the Brazil-Germany nuclear agreement. It was built by Westinghouse with financing by the Eximbank and Morgan Guarantee Trust. Its estimated cost is $2,000 per kilowatt hour installed and the total cost of the plant was set at $1,252,000,000.

The civil engineering work of Angra 1 was initiated in October 1972, while the seismic, geological and land preparation work was begun in 1970. Therefore, the construction of Angra 1 took 11 and one-half years, which is within the world average for developing countries.

Erosion Threatens Transmission Tower

Sao Paulo FOLHA DE SAO PAULO in Portuguese 25 Jan 81 p 18

[Excerpt] Angra dos Reis--FURNAS engineers are concerned about the erosion caused around the base of one of the Angra 1 nuclear powerplant transmission towers on the shore of the Itaorna Bay by the storm which hit there Thursday morning. The ground was covered with plastic to prevent new water damage and work to prevent further erosion of the slope was begun.

Drainage was begun in the area where the Angra 2 Powerplant is being built and Superintendent Alceu Braga Lopes asserted that it will be completed by tomorrow and there will be no delay in the powerplant construction timetable. On the other hand, traffic on the Rio-Santos Highway is normal.

The storm, which lasted almost 10 hours on Thursday and Friday, and the cloudburst which unloaded on Itaorna Beach, once more brought up the question about the social inequality and ecological imbalance in that former lost paradise of the Rio de Janeiro State coast.

It is unlikely that it was ever recorded that a highway buried by slides of more than 10,000 cubic meters of dirt, rocks and vegetation was returned to traffic in just a few hours, as was the case of the kilometer-long stretch of the Rio-Santos Highway at KM 121 between Itaorna Beach and the homes of the FURNAS officials on Brava and Mambucaba Beaches.

Meanwhile, the erosion of wide expanses of slopes, the uprooted vegetation and the gullies made from the top to the bottom of the hills by the force of the water and rocks are wounds which will soon be healed over. However, it will be increasingly difficult to hide the marks of inequality in this "nuclear capital of the country," as Prefect Roberto Carlos Ferreira Vale calls it. He decreed a state of public disaster due to the rain, but one of the most damaged places, the town of Frade (almost 100 persons homeless), "lives in a permanent state of public disaster," in the opinion of Alceu Braga Lopes, the nuclear powerplant construction engineer. There is a lack of paved streets, water, sewers, medical care and jobs.

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CSO: 5100

BRIEFS

DEFENSE OF NUCLEAR PROGRAM--General Costa Cavalcanti, president of ELETROBRAS [Brazilian Electric Power Companies, Inc] and of the Itaipu Binational Company, yesterday defended the Brazilian Nuclear Program when he spoke of the criticisms made of the nuclear policy by the president of the PMDB [Brazilian Democratic Movement Party], Ulysses Guimaraes. "The nuclear program adopted is necessary for Brazil," said the president of ELETROBRAS, "because the country is undoubtedly going to need the electricity from nuclear powerplants when our waterpower capability is exhausted; that will happen at the end of the century." Costa Cavalcanti declared: "We must now begin to take steps to attend to the needs of the end of the century so that at that time we shall know atomic technology. We have between 20 and 25 years to do everything and we even export hydroelectric technology," he said. Costa Cavalcanti, who was in Brasilia this week and will return in February, said that the expenditures of the nuclear program are perfectly valid if one keeps in view the objective of having access to technology. The general, defending the policy adopted in the nuclear energy field, declared that he bases his statements on studies which show the need Brazil will have for nuclear electricity. He said that the first powerplant of the Angra Complex, Angra 1, will go into operation in May or June. "The load on the first powerplant of the Angra Complex will be increased progressively, as happens with all units of that type." Costa Cavalcanti also declared: "The work of the Itaipu Hydroelectric Plant is on schedule and the first units will go into operation in February 1983." [Text] [Brasilia CORREIO BRAZILIENSE in Portuguese 26 Jan 81 p 3] 8908

CSO: 5100

CHILE

LITHIUM PRODUCTION SET TO BEGIN IN 1984

Santiago EL MERCURIO in Spanish 26 Jan 81 p C-3

[Text] Next April preliminary work will begin at the Atacama salt fields on Chile's first lithium extraction program, to be set up with a total investment of $35 million by Chilean Lithium Company Limited (CLCL). This company, composed of CORFO [Production Development Corporation] and a U.S. firm, the Foote Mineral Company, is planning a production level beginning in 1984 of 5,700 metric tons per year with an estimated export value of $15 million.

This information was provided to EL MERCURIO by the general director of CLCL, engineer Enrique Arteaga Llona, who said that in the next few years Chile will become one of the world's most important lithium producers and will produce 12 million of the estimated 1985 production of 85 million pounds of calcium carbonate. He added that lithium, which is the lightest of the metals and the one with highest energy retention characteristics, is being used increasingly in industry for refining aluminum, making porcelain and crystal, as well as manufacturing tiny batteries for watches and other automatic devices. Also it has been used recently in nuclear fusion and may possibly be needed and used in massive amounts in batteries for the electric cars planned for the future.

Setting Up the Plant

Arteaga Llona said that during the present year roads and other basic infrastructure will be built and then, about November, work will begin on building all needed elements of the infrastructure for refining the material in the salt deposits. One of these elements will be enormous sunken places in the terrain lined with polyethylene where the salts will be crystallized and purified by a process of dissolving the salts in water and evaporating the water by use of solar power.

Construction of a chemical plant where the final product will be produced is planned to begin during the first half of next year near Antofagasta; the beginning of large scale production is planned for early 1984.

Lithium is contained in the salt deposits in a small proportion, 0.2 percent. In the first stage of the refining process the proportion rises to 4.2 percent, and the chemical plant will raise it to 20 percent pure lithium in the carbonate produced there.

Initiation of the Project

The firm's general director said that the program began in January 1975, when CORFO and the Foote Mineral Company signed a contract to begin study and preliminary exploration; this led to positive results and the company was formed on 13 August 1980.

All the public works and engineering projects are being handled by a mixed corporation which is to fulfill its contracts by a maximum use of Chilean professionals and Chilean-made materials.

11,989
CSO: 5100

EXPERTS FORESEE UNDERGROUND NUCLEAR STATION

Jerusalem THE JERUSALEM POST MAGAZINE in English 23 Jan 81 p 9

[Article by Aryeh Wolman]

[Text]

THE WORLD'S FIRST underground nuclear power station, encased in a giant cavern several hundred metres long and three-quarters the height of the Jerusalem Hilton, may be built deep down under the Carmel mountain range near Haifa.

Such a project, already rejected by Sweden and the State of California as "a leap into the dark," is currently being investigated by a team of Israeli scientists. A conference of the country's nuclear societies held last month at the Ben-Gurion University of the Negev was told that going underground may be the only method of ending Israel's dependence on imported oil and coal without exposing countless thousands of people to the dangers that would ensue from an enemy attack on a group of nuclear reactors on the densely-populated coastal plain.

Such a group is the latest of a series of plans for nuclear power stations that Israeli scientists have produced over the last 18 years, all of them put in cold storage. But the developments of the last few months have done much to raise the hopes of the country's nuclear experts.

The Carter administration's ban on the export of nuclear technology aborted the decision made by the Rabin government in 1976 to build two 900-megawatt nuclear power stations with reactors supplied by the Westinghouse Corporation.

Washington analysts reckon that, at the very least, President Reagan will honour his compaign pledge to end the freeze on building nuclear power stations in the U.S., and may even revert to the nuclear export policy of the Nixon administration, which agreed to sell Israel a nuclear reactor. A renewed American nuclear programme would have important spin-off effects for Israel if it decided to use outside help and experience to build its own reactors. This, said Prof. Shimon Yiftah, president of the Israel Nuclear Society, is now technically feasible, although the project would take as long as eight to 10 years to complete.

The Mediterranean-Dead Sea canal project, given the go-ahead by the government last August, will solve the problem of finding a remote site close to a supply of water sufficient for one nuclear power station. Prof. Yuval Ne'eman, head of the Canal Project Authority, estimates that in the canal's first 20 to 30 years, as the level of the Dead Sea rises, the flow of water from the Mediterranean will be 50 cubic metres per second. This is sufficient, he said, to permit the production by a nuclear plant of 1,000 megawatts of electricity.

EVEN THE environmentalists, whose counterparts in West Germany, Sweden and elsewhere have been so successful in halting nuclear programmes, have reconciled themselves to a nuclear-based economy in Israel. The opposition, which formed against the 1976 decision to build a nuclear plant at Nitzanim, north of Ashkelon, has faded away.

MK Yosef Tamir, chairman of the Knesset environment subcommittee and of the ecologists' roof organization Life and Environment, said: "There is no alternative in Israel's special conditions but to turn to nuclear power. And nuclear plants are much cleaner than coal-fired ones."

Energy Minister Yitzhak Moda'i told the conference that the government would make a decision on whether and where to build the country's first nuclear power station as soon as the Horev committee on nuclear energy set up in October submits its first report. This is due in April. A nuclear plant could be built in less than five-and-a-half years, he said.

But the fears of nuclear power remain, fed by several near-catastrophes, such as the one at Three-Mile Island in Pennsylvania, and reports that the Soviet Union has closed down nuclear plants after major accidents that have claimed hundreds of lives.

Prof. Antonio Peranio of the Haifa Technion predicts that if a nuclear plant on the coastal plain were successfully penetrated by terrorists or enemy missiles, or if all the safety systems failed after a major accident, thousands would be killed within a 25 km. radius by radioactive poisoning, while tens of thousands would suffer radiation sickness and cancer.

The scientists at the conference in Beersheba tended to regard the public's fears as exaggerated, whimsical and irrational. Prof. Chauncey Starr, vice-chairman of the Electric Power Research Institute in California, was applauded when he said: "I have absolutely no faith in the consistency of public opinion. When the survival of a country is seen to be at stake, the opposition to nuclear energy will disappear."

The Israel Atomic Energy Commission, however, is more willing to take conventional public fears into account. Dan Litai, one of its members, said they would not use the traditional form of economic, cost-benefit analysis when making decisions about nuclear power stations, for "this would involve deciding how many shekels a human life is worth."

Their method has been to look at how human beings evaluate the risks in other areas such as cigarette smoking, driving or work hazards. The conclusion is that people fear unknown risks more than familiar ones, even if the objective dangers are the same. Similarly, people are more afraid of man-made than of natural risks, of involuntary than of avoidable risks (even if they don't avoid them), of a small risk of a catastrophe than of a big risk of a smaller accident.

A nuclear plant poses unfamiliar, man-made, involuntary and potentially catastrophic dangers. Thus an analysis of this sort gives added attraction to the proposal to build it underground.

The main argument for going below the surface of the earth is that in Israel there is no completely adequate site above ground. The one exception may be the banks of the projected Mediterranean-Dead Sea canal in the north-west Negev or in the area of Kiryat Gat. But the maximum capacity of such a station would be 1,000 megawatts, and it would still be vulnerable to enemy attack.

Alex Beck, head of the Atomic Energy Commission's siting and national planning department, has undertaken a survey of potential sites, which will be published in a few weeks' time. He says the great quantities of water required to cool a nuclear plant ruled out the southern Negev, despite the attraction of its remoteness from population centres. And no plant could be built near the Gulf of Eilat because of the seismic instability of the Rift Valley.

Sites in western Galilee have been considered, as they would be close to water sources and in a sparsely-populated region. But the area is feared to be earthquake-prone and, as the site would be above the large underground reservoir of water that seeps into the Kinneret, a radioactive leak could contaminate the country's entire water supply.

The Nitzanim site chosen by the Rabin government in 1976 was later found to have seismic problems. It is also uncomfortably close to the Tel Aviv conurbation.

In view of all these difficulties, the Atomic Energy Commission set up an inter-disciplinary team of scientists to investigate the possibility of an underground site. They are expected to report within 12 to 18 months.

Alex Beck, who is a member of the team, said the main advantage of such a site is that the earth would protect it from enemy attack and would absorb the radioactivity in the event of a leak. An underground plant would also be more secure from natural hazards such as earthquakes and violent storms. And it could be located closer to the main population centres, thus cutting the cost of carrying the electricity to consumers.

THE CAVERN containing the plant would be about 70 metres below the surface of the earth, said Beck, and would be reached by a tunnel about six metres wide. Access could be difficult if a major fire broke out, he warned. The height of the cavern would be 70 to 75 metres, while it could stretch for several hundred metres into the earth.

The main engineering problem, however, is posed not by the height or the length of the cavern, but by its required width. Beck estimates this as at least 30 metres. The largest man-made cavern in the world, which houses a Canadian hydro-electric station, is only two metres wider. The type of rock in which the power station, or network of stations, is to be encased is thus of crucial importance, and from this point of view the Carmel range may be the most suitable. It also enjoys the advantage of proximity to the sea and to the major cities on the coastal plain.

According to Beck, the tunnelling, extraction of earth and construction work would add only about 30 per cent to the overall cost of an underground nuclear power station. The major expense would be the development of a prototype. This would take at least three years and would add another 80 per cent to the final bill.

The cost of producing a prototype is so great because since 1978, when a two-year study in California came out against building an underground station, there has been no further research into the subject anywhere in the world. But it is possible that U.S. or Sweden, which has also researched and rejected the idea of going underground, would be willing to help finance an Israeli prototype.

BUT THE DECISION to go nuclear is by no means certain — at least, this side of the year 2000.

Dr. Moshe Nelkin, head of the Israel Electric Corporation's research department, speaking at the Beersheba conference, provoked angry heckling from the floor when he suggested that it would be possible to rely entirely on the present oil-fired stations and new coal-fired ones for the next two decades. "It is both wrong and anti-democratic to insist that we have no alternative but to use nuclear power," he said.

He explained that the Hadera coal-fired plant, due to open in a few months' time, could achieve a capacity of 1,400 megawatts, and another giant 2,200-megawatt power station is scheduled for construction at Zikim, south of Ashkelon, if environmentalist opposition can be overcome. Even then, Israel will need to import only 7.5m. tonnes of coal a year, which should be easily obtainable from such major exporters as the U.S. and Australia.

Prof. Starr took issue with Dr. Nelkin over the cost of relying on coal. He said that a coal-fired station in the U.S., with all the environmental restrictions, was even today only slightly cheaper than a nuclear one. And the U.S. did not have to build an infrastructure for transporting and handling coal, as Israel would have to do.

The price of coal will continue to rise, he claimed, while, by the early years of the 21st century, it will be possible to build fast-breeder nuclear reactors, which effectively produce their own fuel, at costs well below those of today.

"By 2030," he predicted, "no one in the world will want to build a coal-fired station."

Both Starr and the overseas scientists at the conference said that, by temperament, the Israelis are well suited to nuclear energy because it is technologically intensive and intellectually challenging. And after two decades of frustration, the challenge of producing nuclear energy, possibly 100 metres below the ground, is exactly what the country's scientists and engineers are looking for.

CSO: 5100

DEVELOPMENT OF NUCLEAR CAPABILITY REVIEWED

Beirut THE ARAB WORLD WEEKLY in English 24 Jan 81 pp 3-5

[Text] Col Mouammar Qadhdhafi's recent creation of a Nuclear Energy Ministry and Libya's recent armed intervention across uranium-bearing land into neighboring Chad has triggered fresh fears in Africa and around the Mediterranean that he is seeking to provide his country with atomic weapons.

Qadhdhafi stressed in a recent interview that the new Secretariat of Nuclear Energy for Peaceful Purposes was formed to give Libya energy self-sufficiency when and if oil supplies dry up within a few decades. It is headed by one of his close associates, Engineer Abdulmajid Baoud.

Since coming to power in 1969 coup, Libya's current leaders have had no qualms about forging ahead in the nuclear energy area.

Major Abdulsalam Jalloud, Qadhdhafi's closestaide, flew to Egypt to consult with President Gamal Abdel Nasser shortly after the revolution. In a meeting recounted later in a book by Nasser's associate Mohammad Haikal, Jalloud reportedly told Nasser that he was hoping to buy the atomic bomb from China.

When Nasser pointed out that atomic bombs were not for sale, Jalloud reportedly replied: "Oh, we don't want a big atomic bomb, only a tactical one."

In 1973 Libya created an Atomic Energy Commission, followed by an agreement with the Soviet Union to build a 10,000 kilowatt research reactor too small to generate electricity for holes and factories. The Soviet Union has in the past built similar plants in Finland, Czechoslovakia, Poland and East Germany.

Under a 1974 agreement, Argentina agreed to provide Libya with scientific equipment to prospect for radioactive materials, and to train Libyan chemists in uranium extraction and purification techniques. Although Libya has signed the Nuclear Nonproliferation Treaty, Argentina has not.

Four years later, Libya signed an accord for "peaceful uses of nuclear energy" with India, allowing students to attend Indian universities for training in nuclear plant management. In exchange, Libya was to provide oil. That deal soured, but there have been renewed contacts recently to revive it, according to diplomats in Tripoli.

Last year, Libya was reported to have contracted with the Soviet Union for the construction of a 440,000-kilowatt nuclear power plant on the Mediterranean coast.

Under that deal, however, Libya would never tax ownership of the nuclear fuel. Furthermore, the Libyans subsequently underwrote a special agreement for safeguards with the International Atomic Energy Agency in 1980.

The general people's congress, a grass-roots assembly which sets policy and reshuffles the government every year, decided to create the new "secretariat," a cabinet-level post, because of "interest in nuclear energy" with a "comprehensive programme" and plans to establish "an advanced nuclear research center."

Secretary Gaoud had previously served as minister for land reclamation and in the key post of liaison of the people's committee.

While the congress was meeting in Tripoli, several thousand Libyan troops were marching into N'jamena, the capital of neighbouring Chad, giving a decisive victory to the faction of President Oueddei Goukouni in a civil war which had lasted over a decade.

Goukouni and Qadhdhafi agreed to throw open their borders and work toward "unity" after the Chadian leader spent four days being feted in Tripoli. The joint communique made no mention of a 6,000 square-mile (15,000 square km) Chadian border strip which Libya annexed five years ago and which, according to a French survey, contains traces of uranium.

France condemned the proposed merger and airlifted military reinforcement to the neighbouring Central African Republic.

One of France's main sources of uranium for its burgeoning atomic energy programme is Africa's largest producer, Niger, closer to Tripoli than Cha. A Niger uranium development project mined by French, German and Japanese companies provides France with 20 percent of its uranium consumption.

Worried about increasing Libyan activities in the area, Niger last week expelled Libya's entire diplomatic staff. Last Wednesday it joined a dozen African countries at a summit in Togo to condemn Libya's plan to merge with Chad, and demanded the withdrawal of Libyan troops.

But Qadhdhafi pledged Libyan troops would remain in Chad despite the Lome summit demands and threatened to retaliate against France with an oil embargo and a boycott of French goods.

Diplomatic sources report that Libya could seek to purchase uranium on the world market for its nuclear plans, but that the basic problem remains technical ability.

"As the oil runs out, it makes sense for Libya to get into civil nuclear activities, but the sheer technology makes their goal a rather distant one," says a Tripoli-based diplomat. "They are not in the same league as the Pakistanis," he said, referring to Pakistan's stress on nuclear development, "and for the moment we can't see anyone who is going to help them build something except with the strictest safeguards."

A Libyan bomb is still several years in the future, says Joseph Micaleff, a scholar at the UN's Massachusetts Intitute of Technology, who recently completed a study of the Libyan nuclear programme.

"Although Libya has secured the means of providing weapons grade material it still lacks the recycling facilities and the technical knowledge to construct an atomic bomb," he study reported.

CSO: 5100

VIEWS EXPRESSED ON NUCLEAR POWER POSSIBILITY

PRP Leader, Aminu

Lagos SUNDAY TIMES in English 1 Feb 81 pp 1, 24

[Excerpt] The leader of the People's Redemption Party (PRP) Malam Aminu Kano, is in full support of Nigeria's effort to develop nuclear weapons. "We must organise ourselves not to fight anyone but to protect ourselves," he said.

But he puts in words of caution: We cannot be lunatic about it. The elimination of poverty and hunger should direct our energy but we should not close our eyes to the area of self-protection, he said.

Alhaji Aminu said that the production of nuclear weapons was a complex process but we must start somewhere.

Former Defense Minister

Lagos SUNDAY TIMES in English 1 Feb 81 pp 1, 24

[Text] A Minister of Defence in the former civilian government sees Nigeria's effort at the production of nuclear weapons as an exercise in self-delusion.

Alhaji Inuwa Wada asked: "If we go into nuclear armament production now, what can we produce?" He also answered, "The best we can produce is what others call 'dirty bomb'"

The former minister noted in an interview with the SUNDAY TIMES in Kano that America and Russia are already developing sophisticated multi-dimensional nuclear weapons.

Besides, Alhaji Inuwa says, nuclear arms development is a very expensive operation on which we should not commit our limited resources at present. He, however, feels that the exploitation of nuclear energy for peaceful purposes is okay.

Alhaji Inuwa expressed anxiety about the security of the country and said that no development could take place without security.

'We should be prepared to defend our land and sea borders.'

CSO: 5100

BRIEFS

FUEL-REPROCESSING CONTRACT--The ENEL has signed with BNFL (Great Britain) a new contract, for a period of 10 years and with a value of more than 100 million pounds sterling, for reprocessing of the spent fuel from the magnox reactor of Latina and for transportation of it to the Windscale reprocessing plant in Cumberland. The BNFL, as is known, has already reprocessed Latina's fuel from the first 10 years of the power plant's operation. It has ordered from the British shipyard Swan Hunter Shipbuilders the construction of a 1,150-ton ship, costing 9 million pounds sterling, designed for transport of spent fuel from the Mediterranean. This ship and the "Bay Fisher," already in service for this purpose, will be adequate to meet the needs of BNFL's European spent-fuel market. The company's European customers are Spanish and Swedish electric-power companies. [Text] [Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian Vol 26, No 8-9, Aug-Sep 80 p 18] 11267

CSO: 8128

PLAN WOULD PIPE LOVIISA NUCLEAR PLANT HOT WATER TO HELSINKI

Helsinki HELSINGIN SANOMAT in Finnish 18 Jan 81 p 31

[Article by Risto Valkeapaa]

> [Text] Nearly a million homes could be heated with cooling water from nuclear power plants.
> Imatran Voima plans to transmit wasted heat through pipes from Loviisa to Helsinki via Porvoo.
> It would reach the capital with a temperature of 160^{0}.

At the present time heat from Finland's nuclear power plants which could heat almost a million single-family dwellings goes to waste.

It goes to waste because the condensed-liquid-type power plant, built to produce electricity, is only capable of recovering a third of the plant reactor's heat output. Then too, the megawatts that are wasted are in an inconvenient form: They are hard to recover from cooling water heated to 10 degrees.

If the plant's technique were changed such that some of the heat energy was siphoned off for remote heating, the use coefficient could be raised to as much as 60-70 percent.

Aside from changes in plant technique, heat recovery would also mean a drop in power capacity. The electric power capacity would on the average drop 1 Mw for every 6 Mw of heat energy recovered.

The biggest problem is, however, heat transmission. Imatran Voima [Imatra Power Company] has even studied the possibility of transmitting hot water by using ships. This, however, has not shown itself to be a clearly profitable alternative, economically speaking. Calculations on the risk nuclear crew would be exposed to — at least at the present time — speak in favor of rejecting ship transport.

So the megawatts contained in the Loviisa nuclear power plant's cooling water currently go into the sea — and are completely lost. The situation is not significantly better in Olkiluoto. True, salmon young that are to be planted in northern rivers are bred in heated condensed water. But even though we may plan to breed these young by the million, the benefit derived from it remains small in comparison with the energy that goes to waste.

Wasted Heat Piped to Helsinki

In 1980 the capital district required about 2,500 Mw of remote heat energy. It is estimated that by the end of the decade heat needs will have grown by over 900 Mw. And where will we get this heat? There are only two sources of practical alternatives: coal and nuclear energy.

We plan to obtain more heat from the Loviisa nuclear power plants, among others. Hot water will [illegible] set in motion through pipes from Loviisa to Helsinki.

The pipe would measure 77 km in length and cost about 1.4 billion marks. As an investment, the project would, however, when all is considered, be more advantageous to the capital district in comparison with the other alternatives. The building contractor would probably be the Helsingin Seudun Lampovoima Oy [Helsinki District Heating Company]. Imatran Voima owns half of it and Helsinki, Espoo, Kauniainen and Vantaa the other half. Costs would thus be divided in half between the capital district and the state power company.

From the standpoint of the capital district, among other things, realities in connection with the location of the nuclear plant support the bringing of heat from Loviisa. On the basis of new calculations, nuclear power is also clearly the most favorable form of energy production. These formulations have their basis in the fact that at the present time two-thirds of the heat energy from nuclear power plant reactors goes to waste. A condensed-water plant, which produces just electricity, recovers only a third of the fuel's energy. By recovering some of the heat energy as remote heat, the coefficient of use could be raised.

The calculations made by the Helsingin Seudun Lampovoima Oy offer those who decide three specific alternatives: The first is the so-called coal alternative. The second would mean a nuclear plant near Helsinki. The third would be a third unit at Loviisa and the use of waste heat from the plants to heat Helsinki.

Comparing the alternatives, in all calculations we come to the conclusion that the most favorable one would be to try to make do with coal until 1988 and build plants with a measured electric power capacity of 1,060 Mw in Kopparnas which would go into operation in 1993 and 1997.

Kopparnas 1 and 2 would each bring the capital district a capacity of 800 Mw. Then we would get from each plant a power capacity of 390 Mw for the use of the capital district and a capacity of 530 Mw for Imatran Voima's use.

If fuel prices rise slowly, the second most profitable alternative would be to build a coal plant on Vuosaari in 1991 and 1993 and Kopparnas 1 not before 1997.

The third alternative would be to bring the heat from Loviisa. This alternative would even give rise to another more profitable one if fuel prices rapidly go up.

As a long-term investment, the so-called coal alternative would mean 5.8 billion marks for the capital district, the Kopparnas nuclear-plant alternative 6.7 billion marks and the Loviisa alternative 4.1 billion marks.

Loviisa 3 Would Require Capital District Participation

These plans mean that Helsinki, Espoo, Kauniainen and Vantaa would also participate in construction of the Loviisa 3 nuclear plant unit through Helsingin Seudun Lampovoima Oy.

Half of the remote heat would be obtained from the third Loviisa unit and the other half from Imatran Voima's other Loviisa plants.

Helsingin Seudun Lampovoima Oy affairs have progressed and are rapidly progressing. The company's general manager is the general manager of the Helsinki Municipal Energy Works, industrial adviser Eino Toiviainen, according to whom we will already have to start making decisions in earnest by next year.

The Helsingin Seudun Lampovoima Oy administration decided to make detailed calculations last fall. Preparation of them is progressing. Urgency is also involved in these calculations since, if the Loviisa alternative should be decided on and we plan to get the third Loviisa unit into operation by 1991, the decisions would have to be made at the latest by 1982. The construction schedule for the heat-transmission pipe would also make decisions urgent since pipe construction will take at least 6 years.

The price evolution of fossil fuels has changed and in future it will probably change views on profitableness even more. According to industrial adviser Toiviainen, facts relating to the location speak for the Loviisa alternative.

"From the standpoint of the plan, among other things, there are reasonable assumptions for building the nuclear plant in Loviisa," industrial adviser Toiviainen said.

"The Loviisa alternative will probably also be more advantageous if the plant cannot be built closer to Helsinki and if the real prices of fuels rise at the present rate. An even more advantageous alternative than Loviisa would naturally be a nuclear plant that was built closer to the capital district," Toiviainen said.

The Swedes are planning even longer heat-transmission distances than from Loviisa to Helsinki. Reports have been made on heating Stockholm with Forsmark 3 energy. The pipeline would attain a length of 120 km. The goal is to go into operation by 1988.

Ship's Cargo of Hot Water

Engineer Heikki Haavisto of Imatran Voima, who has researched heat transmission from Loviisa to Helsinki, does not feel that there is a basis for comparison between the Finnish and Swedish projects. "In Helsinki a considerable amount of coal is used. In Stockholm, on the other hand, they heat almost entirely with oil.

"From an economic standpoint, this is particularly unfavorable since, because of environmental protection measures, we have to use a less sulphurous variety."

Because of their extensive nuclear plant program, the Swedes at the present time also to a certain extent have an overcapacity in electric power production. According to reports that have appeared in print in Sweden, nuclear energy should be used for remote heating for only 5 or 6 years. After that, according to Swedish estimates, nuclear energy would again be needed to produce electricity.

According to current opinions, on the other hand, a parliamentary decision will prevent the construction of a nuclear plant in that situation. Presumably they still intend to heat Stockholm with the new coal plant built in Forsmark.

In their cost estimates, the Swedes have come up with a figure of from 8 to 9 billion crowns. This sum would cover the pipeline to carry the water, three additional structures in Forsmark and the coal-fueled remote heating plant.

At Imatran Voima they have already done a great deal of deliberating over a technical solution to heat transmission from Loviisa. Aside from heat transmission in water, one alternative among others has also been solutions based on the use of salts.

"One alternative that was also carefully examined was heat transmission by ship," engineer Haavisto of Imatran Voima said.

"Because there are no types of ships suitable for the purpose, we had to develop the idea from the ground up. Navigation experts also worked with us."

Pipe Route Already Mapped

In light of information to date, however, ship transport has not been clearly demonstrated to be an economically better alternative than the pipe. Furthermore, there are risk factors associated with it. If the tank were to rupture, no one can with certainty say where we would have to look for the ship. It could even go flying off into the blue. The safety problems are the same as they are elsewhere on gas-carrying ships.

On the basis of a geological map report, a preliminary route for the pipeline has also been thought out. At its deepest point, the pipeline would be 85 meters below sea level. The route outlined for the pipeline runs through Pernaja and Porvoo to Myllypuro. The total distance comes to 77 km. From Myllypuro the pipeline goes on to Patola, Lassila and Mankkaa. In these places the pipeline ties into the remote heating network by means of heat conveyors.

As it leaves Loviisa, the water in the pipe would have a temperature of about 160°. En route, the temperature of the water does not significantly drop. It would be pumped forward through a pipe 1 meter in diameter between Loviisa and Mullypuro with the force supplied by six pumping stations.

In the Helsinki district the water would lose about 100°of heat and then go back to Loviisa in the return pipe at 60°. On the return trip the water would be heated by waste heat from the Skoldvik refinery. However, they would no longer get it up to 160° at Skoldvik.

Outcry From Nuclear Plant Opponents

In Loviisa nuclear plant opponents have cried out against Helsinki's endeavors. Architect and technical licentiate Elmer Badermann says that he cannot understand why the people of Loviisa should care about a nuclear plant which is of no concern to the capital district.

"The people of Loviisa are still capable of understanding that a nuclear plant needed for the national production of electricity is to be built in their city. But it is hard to get people to understand why a power plant needed for one district's use is to be built in Loviisa, particularly when the basis for it is that the plant is of no concern to the district it will primarily benefit."

In industrial adviser Toiviainen's opinion, the Helsingin Seudun Lampovoima Oy's efforts do not, however, add to damage to the environment in the Loviisa district. "On the contrary, recovery of waste heat reduces the heating up of sea water."

In Loviisa municipal director Sigurd Slatis' opinion, Helsinki's use of the Loviisa plants' waste heat for heating is a good idea if only it can be technically realized. "Right now we are also looking into the use of waste heat to provide heat for Loviisa's 9,000 residents.

"I have also publicly announced that, if we need a new nuclear plant, it would make sense to concentrate and put up the plant where there are already others. It is cheaper for the national economy," Slatis said.

11,466
CSO: 5100

FINLAND

LOVIISA NUCLEAR PLANT TO INCREASE USE OF SIMULATORS

Helsinki HELSINGIN SANOMAT in Finnish 15 Jan 81 p 11

[Text] Loviisa (HS)—A significant extension of the use of the training simulators built in connection with the Loviisa nuclear plant is planned right from the start. One reason for the extension is the possibility of creating a so-called water-lock situation in Loviisa-type plants.

Investigations have shown that the creation of a water lock which stops the natural rotation of the main rotary circuit has not been completely prevented at Loviisa.

A water lock could be produced in the bends of the plants' heat exchangers. In the worst event, the creation of a water lock could mean that the upper ends of the fuel rods are dry, overheating and possible damage to the fuel.

But before a water lock can be created, there has to be steam in the main rotary circuit. The possibility of steam appearing was, however, not taken into account in the training simulator that was put into operation in early October.

The function of the plant's surveillance system is simulated in the simulator set up for Hastholmen. With its aid an effort is made to above all increase the operational safety of the nuclear plant. With it surveillance personnel are given initial and review training. With the device they can practice emergency situation procedures which would otherwise be impossible without interfering with the production of electricity at the plant.

With the device personnel are also trained in the controlling of accident situations.

The VTT (Valtion Teknillinen Tutkimuskeskus; State Technical Research Center), which took part in developing the simulator, uses it in surveillance-related research projects. Among other things, the VTT performs research on people's behavior when under stress or agitated.

One of the industry's most up-to-date simulators, it is worth about 30 million marks. There are about 30 comparable devices in the world.

With the exception of some computer mechanisms, the Loviisa equipment is almost entirely domestically produced. Oy Nokia Ab supplied the computer system. The surveillance equipment came from Siemens Oy. The VTT and Imatran Voima also contributed to a significant extent to the creation of the system.

The Loviisa simulator was first built as an integral unit at Oy Nokia Ab's Pitajanmaki plant and then shipped to Loviisa in parts to be reassembled between February and September of last year.

According to simulator center manager Markku Tiitinen, the simulator has already come to constitute a sort of tourist attraction which particularly interests Finnish and foreign experts.

11,466
CSO: 5100

FINLAND

BRIEFS

NUCLEAR PLANTS ALL OPERATIONAL--During the past year, the nuclear power plants in Finland have not operated at their best, but now it is hoped that finally all four power plants will be able to operate at the same time. There have been difficulties with the Russian-built Loviisa 1 and the power had to be turned down on numerous occassions. But the power plant continued to operate until it was stopped on 9 May for annual repairs, which lasted over half a year. Loviisa 2 is 2 1/2 years behind schedule based on the original timetable. The pressure vessel had some leaks and had to be repaired. The Swedish-built Olkiluoto 1 had to be stopped 10 times at the beginning of the year. In April the rotor section in the generator was repaired and in mid-May it was time for annual servicing. In November, the repaired rotor was installed. The trial operation of Olkiluoto 2 has been interrupted because the rotor had to be sent to Sweden for repairs. Now test operation is underway and it is assumed that the power plant can be turned over to Industrins Kraft AB in early 1981--if no new problems arise. [Text] [Stockholm DAGENS NYHETER in Swedish 31 Dec 79 p 6] 9336

CSO: 5100

FRANCE

SITES, DATE INTO SERVICE OF PLANNED NUCLEAR PLANTS ANNOUNCED

New Plant Sites, Dates

Paris LE MONDE in French 7 Jan 81 p 34

[Article by Marc Ambroise-Rendu: "The Sites of the Future Plants Are Now Known, But Will Not Be Fixed Before the Presidential Elections"]

> [Text] The government has decided to inaugurate a new program for the construction of seven or eight nuclear power plants (or 24-28 sections) which could be linked to the national electric power grid in the 1990's. These units will be added to the 20 reactors already in operation in France, the two power plants built in Belgium with French participation (Tihange, 50 percent) and Spain (Vandellos, 25 percent), and the 46 reactors which will be commissioned in the course of the next decade.

The precise sites of some "third wave" power plants are already known: Plogoff (Finistere), Le Pellerin (Loire-Atlantique), and Civaux (Vienne). As to the others, the involved regional councils will have to make their choice with several options at their disposal such as Auvergne, Languedoc-Roussillon, Aquitaine and the Paris area in the broad meaning of the term.

Under normal circumstances, such consultations would have taken place as of the beginning of this year. However, in order to prevent local nuclear debates to "burden" the presidential campaign, the government has decided to extend the deadline beyond next April's elections.

Nevertheless, as a result of an investigation which involved the participation of our correspondents, we can describe today the major guidelines of the third wave and of a certain number of sites among which the regional assemblies will have to choose.

Let us note that the nuclear effort of the 1990's will be focused on areas which have remained so far relatively or totally unaffected by the previous waves: Poitou-Charentes, Auvergne, Aquitaine, Languedoc-Roussillon, Burgundy and Champagne-Ardenne. We are witnessing, therefore, a redressing of the balance of electric power production plants emphasizing the southwestern half of the Hexagon.

Brittany: Work at the Plogoff site should begin, regardless of the opposition of the population of Pointe de Raz, shortly after the presidential elections. The EDF [French Electric Company] is already purchasing house buildings for its personnel.

The Loire country: After much hesitation the minister of industry has given the green light for the Pellerin site (close to Nantes). He was given the full support of the communist party which, as elsewhere, is in the camp of the most determined supporters of nuclear power.

Poitou-Charentes: The EDF will submit a request for a statement of public utility for the Civaux power plant. The public investigation will be conducted in the summer of 1981.

Aquitaine: As the head of state pointed out in his Mazamet speech, in November 1979, the great southwest will have the "benefit" of two additional nuclear power plants (following those of Braud and Saint Louis and Golfech). The first should be located in Aquitaine. Three sectors are considered. Technically, the best would be either middle Garonne, between Agen and Bordeaux. However, the Golfech "drama" is still fresh. The Peyrehorade site, on the Landes coast at the line separating the Pyrenees-Atlantiques and Landes has been mentioned as well. However, no one has as yet dared to build a power plant on sand. The EDF has declared itself ready to undertake all the necessary feasibility studies if so ordered. A third possible site is the lower valley of the Adour. However, the flow of this river is irregular and the ecology of the area is delicate.

Languedoc-Roussillon: The second power plant of the big southwest will be built on the Mediterranean coast. After abandoning the Paulilles (Pyrenees-Orientales) site, located in the heart of the Vermillion Coast, the EDF is continuing its study of three or four other sites.

The Port-la-Nouvelle site, which was already suggested in 1976, was rejected by a wide majority of the population in a referendum held that same year. The regional council, the general council of the Aude and the municipality continued to say "no." Three months ago, Francois Delmas, secretary of state for the environment, announced that the site had been abandored.

That leaves Fleury at the mouth of the Aude (the municipality, however, is opposed), Frontignan, which has been considered for quite some time, and even Martigues (Herault).

Bearing in mind the local political climate, the political authorities are measuring their steps: the local population will be consulted this autumn and, on the basis of their response, the request for a declaration of public utility could be submitted in 1982.

Auvergne: Here matters are far easier, for it was the original council which requested the plant. Three sites have been noted along the Allier:

In Limons, an agricultural area of Puy-de-Dome, the power plants would be welcomed by the mayor (the majority), unquestionably supported by Michel Debatisse, secretary of state for agricultural and food industries, and municipal councillor of a nearby commune, and welcomed by the socialist mayor of Puy-Guillaume, a big industrial town. However, it would require the moving of the pumping station of the commune, and the re-alignment of the Allier river bed. However, the city of Vichy, located 15 kilometers upstream, fears the consequences of such an installation.

Ferte-Hauterive (Allier) is down river but still quite close to Vichy. The power plant here would be accepted by the mayor, the municipal council (a varying majority), the general councillor and the deputy, both communists.

Villeneuve-sur-Allier is 15 kilometers away from Moulins, whose mayor, Hector Rolland, a deputy for RPR [Rally For The Republic] is enthusiastically pronuclear. However, the municipal council of the village and the general councillor (socialist) are opposed to the project.

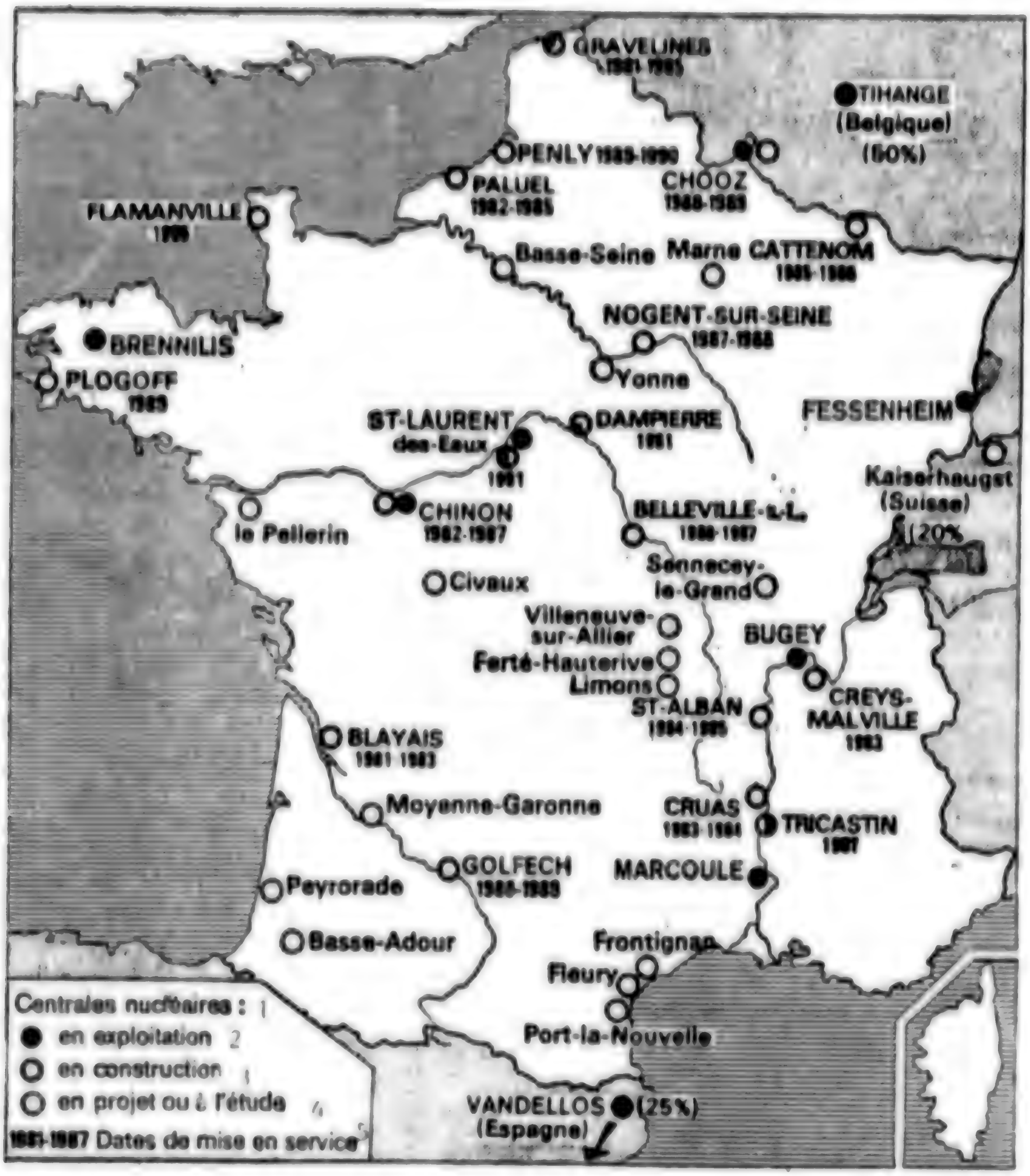
The names of the three sites should have been submitted on 19 January to the Auvergne regional council (chaired by Maurice Bourchon, socialist party deputy, representing Puy-de-Dome) for a selection. The prefect, however, retreated and claims today that several more months will be necessary to complete the studies. Coincidentally, such studies will be completed after the presidential elections.

Burgundy: Two sites have been studied: the first on the Saone and the second on the Yonne. For the past five years there has been talk of a proper site on the banks of the Saone, in the vicinity of Sennecy-le-Grand (Saone-et-Loire). The power plant would be located along the high voltage cable linking the Alps with Paris. The EDF had even planned to build a new super generator. This is no longer considered. The super generator would be more likely built in Marcoule, on the banks of the Rhone, in the Gard. According to EDF officials, the site of Boyer, a small rural commune not far from Sennecy-le-Grand, could be made suitable not before 1985. The other option of the regional council would be a site along the Yonne, shortly before it flows into the Seine. On the other hand, in 1975 mention was made of the communes of Barbey and Misy-sur-Yonne and, on the other hand, of Pont-sur-Yonne. This power plant would close to the Paris agglomeration and properly located in terms of the power grid.

Champagne-Ardenne: Obviously, it is not regional needs that justify the installation of the two reactors of Nogent-sur-Seine but the morbid hunger of Paris. Two additional reactors will be installed on the same site as planned. This may be insufficient, for which reason the EDF is studying other sites along the Marne, in the vicinity of Chalon-sur-Marne, also for supplying the Paris area.

Haute-Normandie: The same reason prevails for the still contemplated construction of a power plant (in addition to Paluel and Penly, on the coast) along the Basse-Seine between Mantes and Le Havre.

Therefore, three suggestions will be submitted in the summer of 1981 to meet the needs of Paris: Burgundy, Champagne-Ardenne, or Haute-Normandie. Conversely, the building of reactors in the immediate proximity of the capital is no longer contemplated.



KEY:

1. Nuclear Power Plants
2. In operation
3. Under construction
4. Planned or under study
5. 1981-1987 start-up date

'LE MONDE' Correction

Paris LE MONDE in French 20 Jan 81 p 17

[Text] In the article and map about the electro-nuclear program of the 1990's, confusion arose concerning the names of two sites in the southwest being investigated at present.

We made a distinction between Peyrehorade and Basse-Adour, when they are really the same site situated near the confluence of the Pau, Oloron and Adour streams, 20 kilometers inland. The other site could be placed on the shore somewhere between the mouth of the Adour and the Mimizan: this is the one which we mistakenly called Peyrehorade.

CSO: 5100

NUCLEAR SAFETY PROBLEMS INCREASE; OFFICIAL RESIGNS

Paris LE POINT in French 15 Dec 80 pp 90-91

[Article by Roland Mihail: "Nuclear Safety: The Reasons for a Resignation"]

[Text] Is there a change in the administration of the French nuclear program? A disturbing document, which until now has remained confidential, seems to prove it. It is this document, a letter of resignation written by "Mr Nuclear Safety", that LE POINT can reveal today.

From Gravelines to Tricostin by way of Dampierre, the French nuclear program has been delayed several months. The primary reason for the delay is the well-known cracks in the main components of the 900-megawatt nuclear plants. These plants make up the new generation of French pressurized water reactors put into service in 1970. According to several experts, these defects have caused a 3-4 month delay in the activation of some nuclear units. At least that is one of the main conclusions put forth by Francois Kosciusko-Morizet, director of quality and safety in industry, during a conference held at the Minister of Industry on Monday, 8 December. The topic of this conference was an appraisal of nuclear safety in 1980.

It was an instructive review. Unfortunately, one question was not raised at all last Monday. It was a small bit of news that went by unnoticed in the commotion surrounding the announcement of the replacement on 18 November of the secretary general of the Interministerial Committee for Nuclear Safety. In short, the appointment of a new "Mr Nuclear Safety", Bernard Augustin, who is 48 years old, a subprefect, a graduate of the Institute for Political Studies in Paris, and, up to the present time, operations officer in the Directorate General of Energy and Raw Materials.

A new "Mr Nuclear Safety"? Up to now, there has been nothing that might stir up a crowd. The general public, it is said, knows nothing about him, even his name. That is the way it is. Yet this high official occupies a position of deceptive triviality. He is the one, the only one, who is by law responsible for coordinating, supervising, and inspecting all the measures taken in the field of nuclear safety, at all levels. He is responsible not to the minister of industry but to the prime minister. In short, among all the leaders in the nuclear industry, he fills a basic role.

It is precisely for that reason that the replacement of the incumbent, which occurred on 18 November, is of extreme importance. Many specialists--and not those least important--have noted this appointment with continued interest. Bernard Augustin, this new "Mr Nuclear Safety" is obviously not a technician, but, they murmur, a politician. He comes right out of the seraglio of energy specialists in the Ministry of Industry; therefore, he was closer to the economic decision-making bodies than he was to the safety organs. He replaced a high official known above all for his experience in the field of nuclear safety and with a reputation among the "initiated" for complete independence of thought and for frankness: Jean Servant, 55 years old, a general engineer of the Ministry of Mines, and for 4 years (1973-1977) head of the Central Service for Safety in Nuclear Installations.

It is clear from this administrative move that nuclear safety has come to a crossroads. To put it simply, there are two opposing trends in the Ministry of Industry. On one side there are those who, along with Servant, want to emphasize nuclear safety. On the other side, there are those who, not wishing to call this objective into question again, hope that there will be an emphasis upon the purely energy angle, and who are more concerned, for example, over curves showing the production of electricity than they are about cracks.

Has the situation been brought under control again? It is difficult to say for the moment. But what is sure is that this change in the incumbent--according to all the information collected by LE POINT--looks indeed like a change in direction. in the application of the French nuclear program. In addition, it is particularly disquieting because Jean Servant himself asked, on the 21st of last May in a letter to Andre Giraud, "to be relieved of his functions as secretary general of the Interministerial Committee for Nuclear Safety." This action leaves the door open to all sorts of questions. As a matter of fact, this high official felt that he no longer had the means for correctly fulfilling his mission.

Today LE POINT can reveal the content of this letter, which has remained confidential. It was sent to the Hotel Matignon, to the secretary general of the government, Marcel Long, and to the Elysee to the nuclear affairs adviser to the president of the republic. The tone of this high official's letter is more revealing of the unwieldiness of the "nuclear system" and of the obstructions of the decision-making bodies in this field than any other statements made on the subject. Six statements are summarized below:

1. "The main difficulty (which is the determining difficulty) is the inability to carry out my functions fully. The mission of inspectorate general for nuclear safety takes up a great deal of the general secretary's time. Now apart from the minister of interior, there appears to be no minister who has given all applicable instructions to his departments to facilitate the implementation of this mission. The departments of the Ministry of Industry have even made it clear that they do not support this mission.

2. "The attitude of the three principal ministries may be summarized as follows: From the state, the Ministry of Health has refused all cooperation under the pretext of being opposed to the stranglehold of the Ministry of Industry's engineers on nuclear safety. The Ministry of the Interior showed itself to be open to a

to a coordination which would spare this service from being directly involved in new problems which are both complex and not a little disturbing. After a period of active collaboration, the services of the Ministry of Industry have progressively backed off and have shunned being informative or cooperative to the point that today there is evidence of a thinly veiled hostility.

3. "The Committee's conception of the missions is such that the general secretary's office does not have to intervene in regulatory procedures. In actual fact, the result is that the latter office has found itself cut off from the decision-making bodies...and even finds itself on the fringes of basic information channels. Under these conditions how can the coordination function avoid becoming a purely formal and illusory function? Although the office of the secretary general is assigned for administrative purposes to the services under the prime minister, it does not exist from a budgetary point of view. Except for the secretary general, the personnel in his office are assigned there by other ministries and the AEC [Atomic Energy Commission]; its operating expenses are borne by the Ministry of Industry. The result is that its dependency upon others is hardly compatible with its inspection mission.

4. "The Interministerial Committee for Nuclear Safety has met only once (on 16 November 1978 and not all members were present). In the absence of a coordinating function directed by the committee itself, the coordinating function is carried out at the service level by the office of the secretary general; however, in some cases,...this coordination has been insufficient, if not nonexistent.

5. "I did not ask for the mission of a general inspectorate; however, having received it, I do not understand not being able to carry out the mission, completely and correctly. Nor can I imagine carrying out my duties in opposition to the services of the Ministry of Industry and even less in opposition to the minister himself.

6. "I shall add that after having built from scratch, or almost, the Central Service for the Safety of Nuclear Installations, it is difficult for me to work with this service in an atmosphere of mutual distrust where conflicts become more frequent, and the pettiness of such conflicts does no honor to the administration and is hardly consistent with a real concern for nuclear safety."

The unfortunate thing is that this situation risks continuing for as long as the decision-making bodies, such as EDF [French Electric Power Company] and supervisory authorities, such as Nuclear Safety, have the same head, i.e., the Ministry of Industry, which is forced to be the judge in its own case. Now the only person in France who could really act as a counterweight to the Ministry of Industry in the field of nuclear safety is properly "Mr Nuclear Safety", because he reports directly to the prime minister. Developments today prove it. That sort of safety is not so sure.

9726
CSO: 5100

BRIEFS

NEUTRON BOMB TEST--In an interview given to FRANCE-SOIR, which appears this Wednesday, 28 January, Mr Samuel Cohen, an American nuclear phycisist believed to be one of the creators of the concept of the neutron bomb, thought fit to assert that France exploded a neutron nuclear device in the atmosphere on the Kerguelen Islands, a French archipelago in the southern region of the Indian Ocean, in September 1979. It has been stated in authoritative circles in Paris that this information is completely groundless and that France has engaged in no atmospheric nuclear tests since 1975 when tests started to be carried out underground at the Mururoa Atoll in Polynesia. It has been stated that, generally, nuclear tests cannot be improvised and that they require a firing range. It has also been stated that France does not have any nuclear firing range on the Kerguelen Islands. In FRANCE-SOIR Mr Cohen explains that the mysterious nuclear-type explosion detected by an American Vela satellite off the South African coast in the southern hemisphere was caused by a French neutron bomb. "Obviously," the American phycisist comments, "I cannot prove this since I have no access to state secrets." "If France did carry out such a test," Mr Cohen adds, "it did not violate any international agreement banning nuclear explosions in the atmosphere because is has signed none." It was in 1976 that the president authorized the Atomic Energy Commission and the French armed forces to test the geometry and performance of a neutron device. [Text] [LD301041 Paris LE MONDE in French 29 Jan 81 p 44]

CSO: 5100

CIPE APPROVES ESTABLISHMENT OF RADIOACTIVE-WASTE MANAGEMENT COMPANY

Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NUCLEARE in Italian Vol 26, No 8-9, Aug-Sep 80 p 20

[Article: "Setting-Up of NUCLECO Approved by the CIPE (Interministerial Committee for Economic Planning)"]

[Text] The CIPE, at its meeting of 11 July 1980, approved the setting-up of NUCLECO (see NOTIZIARIO 26, 18, May 1980), a stock company owned by the CNEN [National Nuclear Energy Commission] and AGIP [National Italian Oil Company]-Nucleare for management of the radioactive wastes of low-medium activity that are produced in Italy in university laboratories, hospitals, research centers and nuclear installations in their everyday operations or as a result of the use of radioisotopes (cf NOTIZIARIO 26, 37-54, May 1980).

Wastes from nuclear-fuel reprocessing and from other fuel-cycle operations are excluded from the company's activities.

Indeed the CIPE's decision specifies that the CNEN retains exclusive competency as regards the confinement of this type of wastes. The CNEN will have a 40-percent participation in NUCLECO's capital, by virtue of the rule that restricts the agency's holdings in industrial companies to a minority position.

Its participation will consist in the providing of expert skills, know-how and equipment.

The CNEN has in fact studied for some time the problem of packaging of wastes of low-medium activity, acquiring experience in installations for the purpose at the Casaccia Center. In particular, definitive disposal of radioactive wastes of low-medium activity will be provided for--while waiting for the CNEN's research and development activities to identify and qualify sites for geological confinement--by the organization of operations to submerge them at great depths in the Atlantic Ocean, within the framework of the activities of the Nuclear Energy Agency (NEA) of the OECD.

The international norms (the London Convention on prevention of contamination of the sea by the discharge of wastes and other substances) do in fact permit the sinking in the sea of weakly packaged radioactive wastes of low and medium activity. Submerging in the sea is systematically done by all the European countries belonging to the OECD, which has established a multilateral advisory and surveillance mechanism for these operations, which are carried out under such conditions as to guarantee immunity of the marine environment from radioactive contamination.

NUCLECO will also provide for decontamination of workplaces, and in the future, for the decommissioning, as well as the creation, for third parties, of installations for the processing of radioactive wastes of low and medium activity. An engineering component is indeed provided for within the structure of NUCLECO.

In its work, NUCLECO will devote special attention to meeting the requirements of small nuclear operators, in addition to functioning, obviously, as an operational tool at the disposal of big users.

This initiative will thus make it possible to solve, under conditions of guaranteed safety, a problem whose solution answers the requirements of many types of users, especially those connected with social services, such as hospitals and universities, in which use is made of radioactive materials.

We publish the CIPE's decision below.

CIPE Decision of 11 July 1980

In view of the law of 15 December 1971, No 1240;

In view of its own decision of 23 December 1977, concerning approval of the proposals to update the national energy program;

In view of its own decision of 29 April 1980, concerning approval of the proposals contained in the CNEN document "guidelines for the Fourth 5-year plan 1980-1984";

In view of the well-known protocol No 722131/E of 17 April 1980, by which the Ministry of Commerce & Industry proposed the setting-up of a stock company between the CNEN and AGIP-Nucleare, named NUCLECO, for management of radioactive wastes of low/medium activity;

In view of CNEN document (79) No 200/CA/REV of 8 January 1980, relative to the company, mentioned above, to be set up;

In view of the favorable judgment by the Board of Directors of the CNEN, expressed at its meeting of 18 March 1980;

Considering the advisability of the country's having available to it a suitable operational structure for carrying out the service of management and disposal of radioactive wastes of low/medium activity;

Considering that said company (NUCLECO) will function on the basis of the knowledge and research developed by the CNEN and under the control of the Directorate for Nuclear Safety and Health Protection of the CNEN itself, as regards the safety and health protection of the workers and of the population against the dangers from ionizing radiation, in accordance with the standards in force;

Having heard the report of the Ministry of Industry, Commerce and Crafts;

The CIPE decides:

to approve the setting-up of a stock company between the CNEN and AGIP-Nucleare named NUCLECO, for management of radioactive wastes of low/medium activity. The CNEN retains exclusive competency as regards the activity of confining packaged radioactive slags, as referred to at point 5.4. of the decision of 22 December 1977 cited in the preamble, confirming also the priority that the CNEN must assign to the activities relating to monitoring of the safety standards in order to ensure the maximum levels of health protection in the matter of processing, management and disposal of radioactive wastes.

The Minister of Budget, Economic Planning & Regional Affiars,
Vice Chairman of the CIPE

(Hon Prof Giorgio La Malfa)

11267
CSO: 8128

BRIEFS

CNEN REORGANIZATION LEGISLATION--On 18 July, the Cabinet approved the bill for restructuring the CNEN. According to this bill, the CNEN would, among other things, take the name of National Committee for Nuclear Energy and Alternative Energies (ENEA). This bill will have to be submitted to Parliament for approval. [Text] [Rome NOTIZIARIO COMITATO NAZIONALE PER L'ENERGIA NAZIONALE in Italian Vol 26, No 8-9, Aug-Sep 80 p 18] 11267

CSO: 8128

PORTUGAL

NATIONAL URANIUM MINING, EXPLORATION COMPANY, URANIUM RESOURCES

Lisbon A TARDE (SUPLEMENTO) in Portuguese 23 Dec 80 p 10

[Interview with Antonio de Almeida Albuquerque e Castro, chairman of the board of directors of the National Uranium Enterprise; date and place not given]

[Excerpt] In 1977, the National Uranium Enterprise (ENU) was created, and as of the end of that year it provided continuity in uranium prospecting and extraction activities. Under the sponsorship of the Ministry of Industry and Technology, the National Uranium Enterprise has a board of directors headed today by electrical engineer Antonio de Almeida Albuquerque e Castro, an individual whose meritorious professional career is undeniable justification for the high post with which he has been entrusted.

Beginning his career as a technical-school professor, he later joined the technological cadres of the CTT [General Administration of Post Offices, Telegraphs and Telephones], going then to the Nuclear Energy Board, and finally to the studies and planning department of the general directorate of the Secretariat of the Ministry of Industry and Technology, after which, finally, he joined the National Uranium Enterprise.

This is the professional profile of engineer Albuquerque e Castro, an exceptionally amiable personality with whom we spent some hours talking about uranium, atomic plants, atomic weapons, and more particularly, nuclear energy.

Following our most enjoyable conversation, we sought to learn some facts we could pass on to our readers in connection with the activity of the Urgeirica Mines, asking our first question about what they are currently.

"Currently," engineer Albuquerque e Castro told us, "the National Uranium Enterprise is engaged in activities in the exploitation sector at five underground uranium mines and three open-pit mines in the districts of Viseu and Guarda, and also, since it was established, it has engaged in the prospecting and study of deposits, with very promising results, since in addition to the fact that the quantity of uranium produced has been compensated for in terms of reserves, there are prospects at present for a substantial increase in the existing reserves in the medium time range (3 or 4 years)."

Work, Compensation, Safety

[Question] How many persons work here at the enterprise?

[Answer] About 610, of whom about 1/5 work in the Guarda district and the other 4/5 in the Viseu district.

[Question] What about working conditions?

[Answer] Work in the mines, in the underground mines above all, is always somewhat difficult, as everyone knows. However, the National Uranium Enterprise, as did the Nuclear Energy Board in the past, has made an effort to ensure the best possible working conditions.

[Question] What has been done about labor safety?

[Answer] With regard to labor safety, we are working to get not only the most advisable techniques but also the equipment best suited to the conditions in each mine adopted. The realm of safety, hygiene and protection is, moreover, an area in which, despite the strictness of our management--if you visit our installations you will see that this is the case--no expense is spared.

For example, in addition to the installation of timbers in shafts, galleries and subterranean cutting areas, and good mine ventilation, we are concerned with supervision through systematic measurement of radon and hydrosulfuric gas, the dust level, dosimetric control of external radiation, improvement of noise and lighting levels at work sites, and we use necessary equipment such as boots, monkey suits, gloves, ear protectors, goggles, etc, etc.

[Question] What are the social benefits the company workers enjoy?

[Answer] In addition to the social benefits provided by the enterprise directly, such as housing for many married workers and rooms for bachelors--and we are implementing a housing construction program in Urgeirica and Guarda--supplements to the legal compensation in cases of labor accident or occupational disease, etc, we have the enterprise's social services, almost entirely financed by the enterprise, which provide:

-Economical lunches;

-Supplemental lunch subsidies;

-Share in the school garden cost, based on aggregate family income and the number of children per worker; and

-Five-percent discount on canteen items, on which the prices are set at only 7 percent profit for spoilage, with regulation of other benefits still being planned.

[Question] What is the annual wage total?

[Answer] In 1980, wages paid the personnel reached a total of about 120,000 contos.

[Question] How much is spent on safety costs?

[Answer] Safety, hygiene and protection expenditures, although I do not have at hand exact figures to give you, must come to between 10 and 15,000 contos a year.

[Question] Is the total volume invoiced annually of great importance to the state?

[Answer] Our annual invoicing varies widely, depending not only on the quantity of uranium which the government, through the sponsoring ministry, authorizes us to sell, but also the product prices on the international market.

In terms of average annual production and average prices for the last 3 years, the value of our production averages around 500,000 contos.

Much Uranium in Portugal

[Question] What are the processed uranium reserves in existence here?

[Answer] I believe you mean the quantity or stocks of uranium which the enterprise has produced and has in storage, in addition to the other state stocks which are on deposit. If this is your question, I can tell you that at the end of this year (with all our expenditures for exploitation and investment charges paid), we will have as of 31 December 1980 about 230 tons of U_3O_8, the value of which, at current international market prices, which in the last 12 months have dropped about 30 percent, comes to about 600,000 contos. This stock represents about a year and a half of the current production of the enterprise.

[Question] And are there still substantial reserves to be exploited?

[Answer] In reserves to be exploited, our country has at this point about 10,000 tons, the processed value of which, at current market prices, comes to about 32 million contos.

These reserves, although modest, place Portugal 13th or 14th in the world. But if we consider uranium "per capita" or per square kilometer of our territory, these reserves place us among the leading nations of the world.

I should moreover add that our country has a uranium-yielding potential which should enable us, if we invest in prospecting and research, to find much more uranium. There are those who believe that there remain more than about 80,000 tons of U_3O_8 to be discovered in Portugal, investments of about 4.5 million contos being needed for the purpose.

However, I believe, with the realism that the responsibilities of the post I hold require of me, that with suitable methodology and equipment and rather smaller investments, we will be able to discover at least 40,000 tons of U_3O_8, with a processed value of 128 to 256 million contos, at current market prices.

As the prospecting work must be systematic and is always time-consuming, and as it is believed that around about the year 2020 or 2030 the commercial value will begin to drop with the advent of fusion reactors, we will have to hurry in order to be able to find and exploit an asset in our subsoil which otherwise will be lost forever.

[Question] On this basis, what dynamics do you believe should be implemented in exploration?

[Answer] Because of what I have said, we will have to hurry, both to discover the uranium reserves which the uranium-bearing potential of our country suggests can be discovered and to exploit them promptly.

Therefore the ENU has already submitted to the government a long-term development plan, up to the year 2000, for its development activities. This plan is currently in the programming and project (economic feasibility studies) stage, and it is expected that as of the end of 1985 our production will be quadruple the current volume, and that simultaneously, the reserves discovered will be at least equal to those we are exploiting, taking into account only the regions of Guarda, south of Tras-os-Montes, Urgeirica and Alto Alentejo (Nisa), which are the regions in which the present known reserves are.

[Question] Tell me, is the company profitable?

[Answer] The National Uranium Enterprise has been in fact profitable in these 3 years of activity. In fact, in 1978 it showed a profit of 150,000 contos, with 69,000 contos in 1979, and it appears that the profit in 1980 will be rather in excess of 100,000 contos, although the accounts and balance sheets for this year are not yet completed.

I should say, however, that the profit figures I mentioned are profits before taxes and payments on company capital. Such payments alone were a little over 52,000 contos in 1978, i.e. half of the profits, before the payment of taxes.

The profitability of an enterprise, in terms that everyone understands, is however a function of its production costs and production values, and these in turn depend on the sale prices for the products. In 1978 and 1979 uranium prices on the international market were very good, having since dropped, as I have told you, about 30 percent in 1980, which has already made it necessary to close down some uranium mines in other countries and to delay the beginning of work on others.

This market situation, in the case of the ENU, forced us too to alter the policy of the enterprise for the coming years considerably.

[Question] Speaking of profits, what are their uses?

[Answer] Profits, after tax and company capital payments are made, or rather after provision is made for tax and company capital payments, are distributed, on the basis of a proposal, to the legal reserve fund, the investment fund, the fund for social purposes and other funds proposed to the government by the boards of directors, in the case of public enterprises, as the ENU is, or the stockholders' general assemblies in the case of private enterprises. It falls to the government or the stockholders' meetings to approve such proposals.

[Question] What share of the taxes paid by the ENU goes to the Nelas self-governing body?

[Answer] The taxes paid to the local self-governing bodies are those required by law, as are those paid to the state. The ENU, although it is a public enterprise, pays the same taxes as any private enterprise.

[Question] With regard to the Nelas council, what role does the company play in terms of work posts?

[Answer] The number of ENU workers in the Nelas council is about 400, which means that this company puts into the council every month between 5,500 and 6,000 contos in wages and other remuneration, excluding the holiday and Christmas subsidies.

[Question] Mr Albuquerque e Castro, you spoke before of a plan for the development of the activities of the enterprise. Specifically, when will it be concluded and what investments will it involve?

[Answer] With regard to implementation, it is scheduled for completion at the end of 1985. The investments in terms of gross fixed capital formation will come to about 3.5 million contos.

We then visited the National Uranium Enterprise installations in Urgeirica, and frankly we were impressed with the complexity of the entire industrial complex, where the busy activity fully reflects the constant and efficient work, in which interest in the well-being of those who work there is not neglected.

We talked with some workers who told us that the ENU is an enterprise which always exceeds the wage table figures imposed by the collective bargaining contracts. One of them told us that "I, for example, belong to the 4th-level technical cadres, and I earn 18,080 escudos, 4,200 more than the wage scale in the contracts which went into effect in May of this year, which call for 13,800.

"In addition to this, we receive a food subsidy of 60 escudos per meal, while the contract calls for 35, not to speak of the seniority payments omitted at the CCT, which are paid here at a rate of 500 escudos per month for each 5 years of work."

We will not comment, merely expressing clearly here an appeal to all those who work at the National Uranium Enterprise to work together to the extent of their abilities, because only thus can the company, which has the responsibility for maintaining about 610 workers, which is the same as saying 610 families, continue to progress. They should not let themselves be deceived with utopian promises which are only of interest to those who do not want to work.

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RADIATION EXPERT URGES DOMESTIC HANDLING OF NUCLEAR WASTE

Stockholm DAGENS NYHETER in Swedish 17 Jan 81 p 6

[Article by Ann-Charlotte Samec]

[Text] The problem of the 500 barrels of low-level radioactive fluids, which are waste substances from research, may be solved in an unexpected as well as fast and inexpensive manner.

The barrels are now left completely unprotected in a parking area at the Royal Caroline Institute in Stockholm until they are disposed of in a waste-disposal plant at Uppsala.

Instead of shipping the waste, at sky-high costs, to a waste disposal plant in Scotland or, on account of the lack of funds of the research institutes, simply allowing the quantities of nuclear waste to build up, the waste is now likely to be burned in Uppsala's municipal waste incinerators.

Low-level radioactive fluids were burned in that facility as late as until 2 years ago. DAGENS NYHETER wrote about the barrels of poison on 17 December. If the question of waste disposal is not solved, the research will be threatened.

"The bureaucratic oscillations with regard to the containers of waste amounted to nothing but fiddling with the problem and were entirely unnecessary," says Per Borg, a chemist at the Uppsala waste disposal office.

Until 1978, low-level radioactive waste substances, the so-called scintillation fluids, which are the waste substances from the research undertaken at the university into the effects of poisonous substances on man, were burned here quite routinely by the municipality.

SAKAB Responsible

"Like Stockholm, we have observed the old law which says that SAKAB (Svensk Avfallskonvertering AB [Swedish Waste Conversion Company Inc.]) must be responsible for all chemical waste. But since no waste disposal plant existed in Sweden, all waste was shipped abroad, which, as is well known, became too costly."

"The fluids are still being burned by the municipal authorities in other university towns, without anybody seeming to react to it. As was the case with Uppsala until 1978, they may not know that the fluids are chemical waste."

"Uppsala has very good incinerators, and if only we get permission to do so, the waste may easily be burned here. We are also willing to handle the waste from the Royal Caroline Institute and Frescati."

The Uppsala municipal authorities have been given permission by the National Swedish Environment Protection Board to test-burn scintillation fluids. The procedure is still more or less the same as before, but low-level radioactive waste will now be mixed with other waste substances.

Permission Forthcoming?

The University of Uppsala, the Royal Caroline Institute, and the municipal authorities at Uppsala now hope that the Swedish Ministry of Agriculture will shortly give Uppsala permission to burn the scintillation fluids.

"Our research will be threatened if we do not get the waste disposal problem solved. One cannot just allow the quantities of poisonous waste substances to keep building up in the parking area," says Per-Åke Hellstrom, safety engineer at the Royal Caroline Institute.

"If we ship the containers of poison to Scotland, this will cost us 200,000 kronor annually, as against merely 50,000 kronor if they are burned at Uppsala. Such an amount could, for example, hurt the cancer research."

The Royal Caroline Institute has 100 barrels of poison. Twenty of them will now be sent to Scotland. Eighty will be left behind in the hope that it will be possible to handle them at Uppsala.

It costs [illegible] kronor per kilo to have the waste disposed of in Scotland, as against a couple of kronor at Uppsala. Each barrel contains approximately 50-60 kilos.

SAKAB Has Had Problems

SAKAB's hitherto almost insoluble problem has been that there has been no plant in Sweden in which to burn the waste, and that it has been necessary to ship the waste to Great Britain, West Germany, France, and Denmark. These countries have been in a position to reject Swedish waste substances at any time.

Last summer, Denmark all but refused to accept the scintillation fluids, and other countries were too expensive as the quantities of waste started growing.

SAKAB, last Thursday, was given the long-awaited permission to build a plant at Norrtorp in the municipality of Kumla, which has been opposing the project for a long time.

Sweden produces annually 500,000 kilos of anti-environmental waste. SAKAB handles 10 percent of this waste. Nearly half of the waste is being handled by the industries producing the anti-environmental waste.

The remainder is stored or disappears in unknown ways. The plant at Norrtorp, however, will far from solve all of the problems. Many dangerous substances will still have to be shipped abroad. Some mercury, for example, will, in the foreseeable future, have to be dumped into the North Sea.

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SWEDEN

BRIEFS

DANGEROUS CRACKS IN NUCLEAR-PLANT--Stockholm, 23 Jan--The cracks found this summer in the water feeder system of four nuclear reactors were serious. If they had not been detected during a routine check at Barseback 2, radio-active water could have leaked out. For that reason the nuclear inspection authorities (SKI) reported the leaks to their colleagues in other nuclear-power countries. This is disclosed in SKI's report for the third quarter of 1980. After the cracks were discovered in Barseback 2, all water feeder systems in all nuclear plants were inspected. Similar cracks were then found at Barseback 1, Oskarshamn 2 and Ringhals. All the cracks have been ground down and welded. Asea-Atom is working on designing better construction the so-called T pipes involved. Special checks of these pipes will be made more often to avoid similar occurrences. The quarterly report also describes the problem with uranium fuel rods which move in the fuel hearth of the reactors. These defects were already detected in 1976, but the measures taken then lasted only to the summer of 1980. Uranium fuel rods which moved have been replaced and made firm. The quarterly report also notes that the unusually warm sea water last summer resulted in a power reduction at Barseback 1 and Oskarshamn 1. Sea water is used to cool the reactors, and the warmer the water, the less effective the cooling process. Consequently, for safety reasons power was reduced. [Text] [Stockholm DAGENS NYHETER in Swedish 23 Jan 81 p 20] 6893

ANTI-NUCLEAR PROTEST--"The Swedish people have been victims of a plot." the Field Biologists say. At a demonstration march in Halsingborg on Saturday with 400 Field Biologists, chairman Goran Wallin stressed that the referendum presented a choice between coal and nuclear power. "But today supporters of alternatives stated before the referendum that they were against coal," Wallin said. The Field Biologists, who held their annual meeting in Halsingborg, are against coal power, which they believe will only increase the electricity surplus, which even today corresponds to four nuclear power reactors. They also point to environment problems, among others, the acidification of soil and lakes due to the coal and oil combustion. An increase in coal usage without efficient cleaning of the sulfur discharges could mean death to fish in a number of lakes. [Text] [Stockholm DAGENS NYYETER in Swedish 4 Jan 81 p 16] 9336

AGENCY TO MEASURE RADIATION--An organization will be established to measure radioactive radiation around nuclear power plants within a range of 50 kilometers. The Radiation Protection Institute (SSI), along with the County Government Boards, will be responsible for this activity. In case of an accident, the Information collected will serve as a basis for the boards' decisions concerning protective measures for the public. This was indicated by a memo from SSI to the agriculture minister. In this memo, SSI explains its request for increased resources to improve preparedness in case of an accident. [Text] [Stockholm DAGENS MYHETER in Swedish 18 Dec 80 p 8] 9336

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